DIAGNOSIS & TREATMENT OF DISEASES IN THE TROPICS

H. C. TROWELL

BAILLIÈRE'S
MEDICAL MANUALS
FOR
AFRICANS

SECOND EDITION

BAILLIÈRE, TINDALL & COX

DIAGNOSIS AND TREATMENT OF DISEASES IN THE TROPICS

BAILLIÈRE'S MEDICAL MANUALS FOR AFRICANS

A Series of Handbooks written for the Instruction of African Nurses, Dispensers and Health Orderlies.

VOL. I. ANATOMY AND PHYSIOLOGY AND CAUSES OF DISEASE.

VOL. II. NURSING.

VOL. III. DIAGNOSIS AND TREATMENT OF DISEASES IN THE TROPICS.

VOL. IV. TROPICAL HYGIENE AND SANITATION.

DIAGNOSIS AND TREATMENT OF DISEASES IN THE TROPICS

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PREFACE TO THE SECOND EDITION

THE second edition of this book has been issued subject to the difficulties that attend the publication of books in time of war. Had the times been more normal there are other changes that would have been made, but it seemed important to disturb the printing as little as possible. As it is, there have been several important alterations to make, notably in the use of the sulphonamide group of drugs, and a new chapter on Diets and Malnutrition has been introduced.

It is always very difficult in a book of this modest size to know what should be included and what should be left out. I had hoped to have included something more in this edition on the question of children's diseases, but the times are rather against one, and these important matters have been held over to the days of peace.

KAMPALA, UGANDA,
May, 1945

PREFACE TO THE FIRST EDITION

THERE is a widespread effort at the present time to supply textbooks to those parts of tropical Africa which have previously lacked them. Indeed, until recent years there were no books suitable for use in the instruction of dressers and nurses in the tropics. As long as the dresser or nurse remained practically illiterate and schemes of training nursing personnel were only at their inception, this absence of textbooks was scarcely noticed. The majority of doctors and nurses who worked in Africa asked of the dressers only a certain amount of truthfulness and faithfulness and cleanliness; if these were attained, the result was deemed satisfactory. It was scarcely considered possible or necessary or desirable that the dresser or nurse should know much. Knowledge was at a discount; the performance of the bare minimum demanded of necessity, this was at a premium.

Time showed that knowledge and performance could not be divorced in this manner. With this realization schemes of training were vigorously prosecuted. Neither did the various territories proceed along identical lines in this respect; some were for short and practical courses; others planned more lengthy periods of instruction. Some centres of training demanded only the capacity to perform certain prescribed methods of treatment, other centres envisaged the dresser as almost a doctor—that is, diagnosis bulked large in his responsibilities, for at the district dispensaries there were practically none but dressers to diagnose the sick.

In territories such as Uganda, where African doctors are being trained, the training of the nursing orderly is seen in its correct perspective—that is, he or she is trained primarily in nursing. Nevertheless, to nurse intelligently it is necessary to be able to understand something concerning disease. It is to supply this need that this book is written. Elsewhere in rather greater detail I have written concerning what a dresser or nurse must learn if, in addition to nursing, he must of necessity take upon himself much of the responsibilities of a doctor. This shorter and more practical book discusses those aspects of medical and surgical disease which must be understood for nursing to become intelligent. For some years I was responsible for the instruction of nursing orderlies in Kenya, and this book contains what I would consider is the bare minimum necessary for any comprehension of medical and surgical diseases.

Since coming to Uganda to assist in the training of African doctors I have been glad to add this small volume to the series of textbooks emerging at Mulago Hospital. The first two—" Anatomy and Physiology," by Dr. J. P. Mitchell, O.B.E., and " Nursing," by Miss Ruth Bagot—are constantly referred to in this book, for it forms the third of a series of three small practical booklets for the instruction of dressers and nurses.

To Dr. J. P. Mitchell I tender my thanks for his assistance and criticism in preparing the manuscript and in reading the proofs. The publishers of my other book, " Handbook for Dressers and Nurses," the Sheldon Press, have kindly allowed illustrations prepared by my wife to be used in this book. These are marked (A). The others have been borrowed from Dr. Mitchell's book, " Anatomy and Physiology and the Causes of Disease," and are marked (B).

The Honourable Director of Medical Service, Uganda, has kindly given permission to publish this book.

MULAGO, KAMPALA,
UGANDA,
April, 1939

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DIAGNOSIS AND TREATMENT OF DISEASES IN THE TROPICS

PART I.—INTRODUCTORY

CHAPTER I

THE GENERAL PRINCIPLES OF MEDICAL DISEASES

Diagnosis — History — Pain — Fever — Loss of weight — Chest symptoms — Abdominal symptoms — Œdema — Nervous symptoms.

The Growth of Medical Science.

In many parts of tropical Africa there was little accurate medical knowledge before the coming of the Europeans. Everywhere there was a belief in evil spirits and in the magical effects of certain medicines.

Things were once the same in Europe. Then about the year 500 B.C. the science of medicine commenced among the people who lived on the shores of the Mediterranean Sea—the Greek, Roman and Egyptian nations. They commenced to study the anatomy and physiology of the body and to observe the changes which occurred in disease. They recorded their observations; at first these were elementary and consisted of the appearance of the face, the tongue, and the presence of fever. Slowly knowledge grew until it reached a high standard in the Roman Empire.

After this civilization had passed away medical knowledge remained stationary for over a thousand years, and it is only since the year A.D. 1500 that modern medical knowledge has grown. Inventions like that of the microscope increased enormously our understanding of disease. Discoveries in chemistry have added to the number of drugs which are employed.

The growth of medical knowledge has been slow. It is still proceeding. There are many things yet which are not at all clearly understood.

Diagnosis.

The scientific study of disease has emphasized that before a disease can be treated it must be diagnosed. This is a fundamental law to which there are no exceptions. It is useless to note that a leg is swollen and to try and find a medicine to make it smaller. The leg may be swollen because the bone is diseased or because the heart is failing.

Difficulties in Diagnosis.—The diagnosis of disease is extremely difficult because it is usually impossible to see the diseased organs. Only the surface of the body and its excreta can be examined. For this reason, wherever a doctor is available, he and he alone should diagnose. Dressers and nurses may assist in various ways. They will often act as interpreters so that the doctor can understand clearly the patient's symptoms. They may assist the doctor in his examination by placing the patient in the required position, or by bringing instruments as requested by the doctor. They will prepare and collect the specimens which are sent to the laboratory. Finally, they are usually responsible for the treatment ordered by the doctor. Behind everything stands the doctor, and his most important task is to diagnose his cases correctly.

Dressers making a Diagnosis.—At certain dispensaries, clinics, and out-patient departments there may be no doctor, or perhaps he attends only at certain hours. The dresser must then take upon himself the responsibility for diagnosis. Many minor cases will be diagnosed correctly; other more serious cases should be set on one side for the doctor's visit, or should be sent to the nearest hospital. Nothing but long experience can guide a dresser in the choice of those patients which can be diagnosed and treated by him and those cases which must be referred to a doctor.

The Method of Diagnosis.—When a dresser is working by himself, he must proceed in the order which a doctor adopts in dealing with a patient—that is, he must first obtain a history of the patient's **symptoms.** He will then examine the patient to find the **signs.** The diagnosis is made on a consideration of the symptoms and the signs. Once the disease is correctly diagnosed, the treatment can be decided. In certain cases considerable help will be obtained by the examination of laboratory specimens, but this is not possible at most dispensaries, and its importance can, at least for dressers, be emphasized too much.

The History.

When any organ becomes diseased it will show changes in its function, and the patient will become aware of some of these changes. He notices that he is feverish or that he has a cough. Symptoms are really the changes in the function of diseased organs. These symptoms are the first sign of disease. Later on certain changes in the organs occur, which are changes, not so much in their function, but in their structure—that is, the organs may swell or change their shape. These are signs, but they are always later in appearance than the symptoms. The first guide to the presence and the nature of any disease is therefore the symptoms which are produced. For this reason it is very important to get a clear idea of the symptoms—how they started and how they developed. If this is done accurately, it is then usually possible to make a diagnosis, even before the patient is examined. Even if it is impossible to diagnose from the history alone, it should always be possible to suggest certain diseases which the patient may have and then to examine for these diseases. It should also usually be possible to say which part of the body is diseased. This part should then be examined carefully. Finally, in a large number of diseases, such as the diseases due to tapeworm or roundworm, there may be no signs found. These diseases will usually be missed unless a careful history is taken.

Difficulties due to the Patient.—Many difficulties will be met in taking a history. Uneducated patients do not understand the importance of giving a history correctly. They may exaggerate some symptoms, and do not mention others. They are often very inaccurate in stating the length of time during which they have been ill. They may conceal their real complaint, especially if it is a venereal illness.

Difficulties of the European Doctor.—Doctors, who seldom speak fluently to native patients, are apt to neglect the history. They rely chiefly on the signs found in the physical examination. If dressers have to diagnose, they will not be able to examine their cases as thoroughly as a doctor, so they must rely on taking an accurate history.

Taking a History.—It is impossible to teach how to take a history from a book. It can only be learned by continual practice. Briefly, it consists of two parts. Firstly, the patient should be encouraged to **tell in his own words** exactly how and when the illness started, and everything he has felt and noticed during the course of the disease. Intelligent patients may in this way tell us practically everything which has occurred. Unintelligent people usually tell us very little. Secondly, **questions** are put to the patient to find if certain symptoms are present. They will vary from case to case. Only experience and a knowledge of the symptoms which occur in the different diseases can suggest which questions are necessary.

Native Ideas concerning Disease.—Patients often have their own ideas concerning what is wrong. That is natural, but they are not always correct. When they complain of a certain disease, such as syphilis, it is necessary to enquire what symptoms the disease is producing. It is frequently found that they are suffering from some other disease. Again, patients have many symptoms which cannot be translated into scientific medical terms. Dressers who know the patient's language should have little difficulty. Thus a snake in the abdomen may be the pain which is called colic, and heart pain, as it is called, may be really an abdominal pain. Many mistakes are made by translating incorrectly into English native ideas concerning the nature of a symptom or the diagnosis of a disease. If diagnosis were really easy, there would be no need for doctors to be given a long training. Even doctors often have great difficulty in making a diagnosis.

Pain.

Most patients will complain of pain. Pain forces the person to seek medical aid. Diseases which cause little pain, at least in their beginning, often end fatally. The patient usually comes too late for treatment. This is true of pulmonary tuberculosis and of syphilis. Pain also forces the patient to rest the part which is diseased. This is an excellent thing—indeed, rest is the first principle in the treatment of all diseases.

Position of the Pain.—When a patient reports any pain, it is necessary for him to describe extremely accurately where the pain is felt. To do this it is often necessary for him to undress and to point with his finger. He may be slow to do this, and he may find it difficult to point accurately to the exact site of the pain. After insisting upon this, he will usually do it. The pain is frequently most severe in one place. This place must be found. In other cases the pain is felt over a large area, and is not severe in only one position. Certain pains may appear to start in one position and then radiate in a certain direction. All this must be understood accurately, for upon it the diagnosis will be largely decided.

Severity of the Pain.—An attempt should be made to determine the severity of the pain. It may be only a slight discomfort, it may be moderately severe, or it may be extremely severe. Many patients tend to exaggerate the severity of the pain. It should be possible to ascertain its severity by finding out if it interferes with his work, his pleasures, his meals, and his sleep. Finally, a severe pain is shown on the patient's face.

Nature of the Pain.—It is extremely difficult to describe any pain in words. Nevertheless, an attempt has been made and a large number of terms are used. A pain may be sharp, or it may be a dull ache. It may be constant, or it may vary considerably from hour to hour. It may radiate, or it may be localized. It may be burning or bursting or shooting. Many severe pains cannot be accurately described in words.

Common Types of Pain.—Certain of the common varieties of pain and their causes will now be given.

Headaches: Malaria, all fevers, anæmia, coryza, cerebral syphilis, nephritis, diseases of the eye.

Pain in the **throat:** Tonsillitis.

Pain in the **chest:** In front and above, bronchitis, all simple coughs, syphilis of the aorta; at one side, severe and cutting, lobar pneumonia, and pleurisy.

Pain in the **præcordium** (front of the heart): Syphilis of the aorta and heart, heart failure, palpitations, and anæmia.

Pain in the **abdomen:** Colic, diarrhœa, dysentery, worms, and constipation.

Pain **under the left ribs:** Enlarged spleen, malaria.

Pain **under the right ribs:** Diseases of the liver and gall-bladder.

Pain in the **lower part of the abdomen:** Diseases of the bladder, uterus, and Fallopian tubes.

Backache and **lumbago:** All fevers, chronic rheumatism (often due to gonorrhœa), diseases of the spine.

Pain in all the **limbs:** Malaria, all conditions of cachexia and anæmia.

Pain in many **bones:** Late syphilis and yaws.

Pain in **joints:** Gonorrhœa, syphilis, chronic arthritis.

Certain terms are occasionally employed to describe a pain the cause of which is not known. Thus neuralgia is pain in a nerve. Myalgia is pain in a muscle. Pleurodynia is pain in the chest; even lumbago is often used for pain in the lumbar muscles of the back. These terms should be avoided if possible, since they do not refer to any particular disease.

Fever.

Uneducated patients often do not report the presence of fever. It does not appear important, and is only acknowledged after direct questioning. Other patients who suffer from wasting diseases and anæmia often feel chilly, and may state that they are feverish. They show, however, no rise of temperature. Fever may be defined as a change in the body, manifesting itself in many ways, one of which is a rise of temperature.

Symptoms of a Sudden Rise of Temperature.—In malaria, lobar pneumonia and a large number of diseases the temperature rises suddenly in a few hours to 103° or 104° F. This will usually be accompanied by a definite sequence of symptoms. The patient first of all starts to feel severe **malaise**—that is, the whole of his body feels ill. He may have **pains** in the limbs. **Headache** occurs, and he is giddy and may faint; perhaps he vomits. Soon he commences to feel extremely cold, he shivers from head to feet, his teeth chatter. All this is called a **rigor.** If his temperature is taken during the rigor, it will be found to have risen already to 99° or 100° F. Soon this cold stage is replaced by one of warmth. He **feels hot** and is hot, the temperature having risen even to over 104° F. He takes off his clothes, he is restless, and he becomes thirsty. The skin is hot and dry. Later the temperature may remain high; in this case the skin usually remains dry. Should sweating occur, this is accompanied by a fall in the temperature. He is often **delirious** at night. To recapitulate, the symptoms of a sudden rise in temperature are malaise, a rigor, a hot stage, and a sweating stage.

Symptoms due to a Slow Rise of Temperature.—In this the stages are not as well marked as in the case of a rapid rise. There is **usually no rigor.** The first thing which the patient notices is that he feels hot. At the same time malaise, headache, and loss of appetite usually occur. After a day or two the patient feels so weak and giddy that he is forced to go to bed. The other symptoms of continued fever, such as constipation, sweating, and pain in the back and limbs and delirium, may be present. To recapitulate, the slow onset of fever is marked by general malaise, headache, pain in the limbs, loss of appetite, hot and cold stages, but not by severe rigors.

Loss of Weight.

Loss of weight may be reported by the patient—that is, it is a symptom; more commonly it is noted as a sign during febrile illness. The fatty tissues waste, for the fat is burnt to create the excess of heat. In addition, the appetite is poor and the diet is limited, so that the body has to use up its stores of food which are present in the muscles and fatty tissues. **Tuberculosis** is an example of a **long-continued fever,** and therefore produces much wasting. Any disease in which essential internal organs are destroyed, such as the liver in **cirrhosis** and the kidney in **chronic nephritis,** produces much loss of weight. Diseases which interfere with digestion, such as **chronic dysentery, diarrhœa,** and **helminthic worms,** all produce wasting. Severe loss of weight in a baby is called **marasmus,** and is usually due to incorrect feeding.

Chest Symptoms.

Pain in the chest may be due to many different causes (Fig. 1). It may arise from the muscles, the ribs, the pleura, the heart, the lungs, and the bronchial tubes. The spine and even those organs which lie in the upper part of the abdomen may cause pain in the chest.

Pain arising from the **muscles or ribs** produces pain in the affected parts. Labourers who use the hoe and do manual labour often complain of pain in the chest and shoulder muscles, due to strains and rheumatism in these parts. Disease of the **bronchi** (bronchitis) produces pain under the upper part of

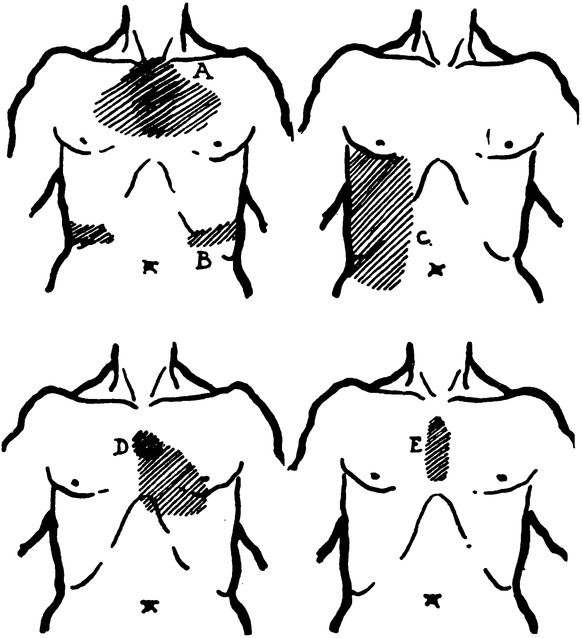


FIG. 1.—THE SITE OF PAIN IN THE CHEST.

A, Bronchitis; B, repeated cough; C, pneumonia and pleurisy; D, heart disease; E, "pain in the chest." (Heavy shading indicates where the pain is more severe.) (A.)

the sternum. Diseases of the **pleura** (pleurisy) and of the **lungs** (pneumonia and tuberculosis) often produce a sharp cutting pain on the affected side of the chest. Diseases of the **heart** or **aorta** often, but not always, produce pain under the sternum and under the præcordium. Diseases of the **spleen, liver, and stomach** often produce pain in that part of the chest wall which covers the affected organ. Many patients complain of chest pain, but no cause can be found. If they have any cough, they may be given cough medicine and be diagnosed as " cough." If they have no cough, they should be diagnosed as " pain in the chest " and treated with liniment and aspirin. If the pain persists they should consult a doctor.

Cough.—This is a sign of irritation of the respiratory tract which commences in the nostrils and descends through the pharynx, larynx, trachea, and bronchi, to end in the alveoli of the lungs, the latter lying in the pleural cavity (" Anatomy and Physiology," Chapter VII.). Disease of any part of the tract causes cough. Most patients who complain of a cough have nothing wrong in the lungs, but suffer from disease of the pharynx (pharyngitis). Cough tends to remove the irritating body—the dust, bacteria, mucus or pus—from the respiratory tract.

Varieties of Cough.—A cough may be **dry** (that is, it produces no sputum) or **productive** (that is, sputum is produced). **Lobar pneumonia** causes a short, sharp, painful cough. **Bronchitis** causes a loud productive cough, which is not very painful. **Whooping-cough** results in paroxysms of cough—that is, the coughing is continuous for a short period of time, after which it disappears until the next attack of coughing. This paroxysm is terminated by whooping and frequently by vomiting.

Sputum.—This is produced in all diseases of the bronchi and of the lungs. Sputum should not be confused with saliva—the former being thick and usually contains mucus and pus; the latter is watery, clear, and contains no pus. If blood is coughed up, this is called a hæmoptysis. The varieties of sputum are considered on p. 28.

Shortness of Breath (Dyspnœa).—The patient feels short of breath when the circulating blood is not receiving enough oxygen. As a result the patient breathes deeply, and in addition there is a peculiar sensation of respiratory distress. It occurs chiefly in **heart failure** and in **severe anæmias.** It is not common in diseases of the lung, except in **asthma,** which produces attacks of severe dyspnœa, which tend to recur at night.

Palpitations.—These indicate that the patient is conscious of the beating of the heart. This is normal in fright and after severe exertion. They are also common in **indigestion,** and are always present in severe **anæmia.** Palpitations may occur in heart disease, but are not a proof of heart disease. If **heart disease** is present, there will always be some dyspnœa after even slight exertion.

Abdominal Symptoms.

Pain.—Pain is felt in many abdominal diseases. Its position and character and relationship to the functions of the various organs form the most important guide to diagnosis. Its severity may also help, but it should be remembered that uneducated patients tend to exaggerate any pain.

Position of the Pain.—Reference to " Anatomy and Physiology," Chapter VIII., will explain why disease of different abdominal organs causes pain to be felt in varying positions (Fig. 2).

Diseases of the **stomach**—gastritis and gastric ulcer—cause pain in the upper and central part of the abdomen. Diseases of the **small intestine** often cause colic, which is felt vaguely and equally in all parts of the abdomen. Disease of the **large bowel** or **appendix** causes pain over the affected part. Diseases of the **liver** may cause pain under the right ribs. Diseases of the **spleen** may cause pain under the left ribs. Diseases of the **bladder, uterus, and Fallopian**

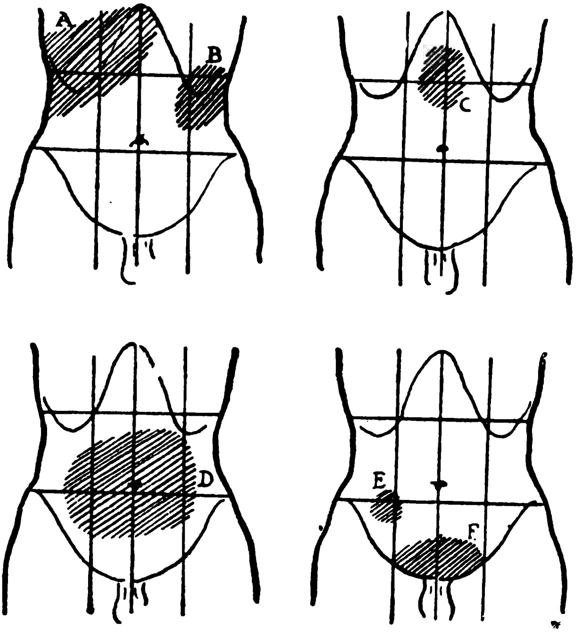


FIG. 2.—THE SITE OF PAIN IN THE ABDOMEN.

A, Liver; B, spleen; C, indigestion and stomach; D, colic and small intestine; E, appendicitis; F, bladder and uterus (A.)

tubes ("Anatomy and Physiology," Chapter XI.) cause pain deep in the pelvis and also behind over the sacrum. Some **kidney** diseases cause pain in the loin. Serious disease can occur, however, in the solid organs, the liver, the spleen, and the kidney, without any pain being felt.

Character of the Pain.—Colic is characteristically intermittent and varies much from minute to minute. It is said to be griping, for it is a severe internal pain which suddenly seizes the patient.

Continuous pain usually suggests that in one of the organs there is some serious disease which has spread to the peritoneum. This applies especially to the intestines and Fallopian tubes, which may perforate into the peritoneal cavity, causing peritonitis.

Relationship of the Pain.—If the pain is **aggravated by eating,** it probably arises in the stomach or adjoining organs. Similarly, a pain which is made worse or relieved by an action of the **bowels** indicates disease of the colon or rectum. Painful frequent **micturition** shows that the bladder or urethra is affected. Painful **menstruation,** which is common in unmarried women, indicates a faulty uterus. In a married woman it is uncommon apart from serious disease of the genital organs.

The Bowels.—Most Africans have two or three motions of the bowels each day. A few have only one action and fear that they are constipated. This is not true, for **constipation** is only present if more than twenty-four hours pass without any action of the bowels. The number of motions depends largely on the **diet.** If this contains many husks and coarse vegetable fibres, the motions will be frequent and the stools will be soft. Any illness which reduces the amount of food eaten will produce constipation. In fever the constipation is partly due to a reduction in the diet and partly due to a sluggish action of the intestines. Before diagnosing that constipation alone is present it is important to find if any more serious disease is also present.

Diseases of the Intestines.—In **diarrhœa** the small intestines are diseased, and the stools are increased in number and are watery.

Dysentery is due to disease of the large bowel, and produces blood and mucus in the stool. **Helminthic worms** may be seen in the stools, but patients often omit to report this fact. Segments of the **tapeworm** are seen like small pieces of white tape. **Roundworms** appear as long worms, brownish-red in colour and about the length and thickness of a pencil. Hookworms are never seen by the patient; they are too small to be observed. **Threadworms** appear as small white thread, moving on the surface of the stool.

Symptoms present in Diseases of the Stomach.—**Vomiting, nausea,** lack of appetite, and **pain** in the upper part of the abdomen indicate that the stomach is affected. Diseases of the stomach are not common in Africans, but other diseases such as fever, helminths, and diseases of the liver and heart frequently disturb the action of the stomach and produce similar symptoms.

Distension.—Certain patients may feel distended, although no swelling can be observed during the examination. This should suggest the presence of helminthic worms or constipation. In other patients the distension is not only felt, but is observed. It may be due to several causes, which may be memorized by the fact that they commence with the letter "F." **Fæces** may accumulate in the colon during constipation. **Flatus** is an excess of gas in the colon. **Fluid** may appear in the peritoneal cavity affected by ascites. A **fœtus** is found in the pregnant uterus. **Fat** occurs in the abdominal wall or around the internal organs. Tumours in the abdomen may also cause some **fulness.**

Œdema.

If fluid accumulates in the tissues of the body, this is spoken of as œdema. The legs are most commonly affected, but even the face, the back, the hands, and even the peritoneal cavity may be affected. It is present in the **heart failure** in certain forms of **nephritis,** in **ancylostomiasis** and **anæmia.**

Genito-urinary Symptoms.

Many diseases of the kidney, especially **nephritis,** cause no pain in the loin. Other diseases, such as **calculus** (stone) and **pyelitis** (inflammation of the pelvis of the kidney), sometimes cause severe pain in this part. **Diseases of the bladder** cause frequent painful micturition and pain in the lower part of the abdomen. The only common disease of the urethra is gonorrhœa, which causes painful micturition and, in addition, a discharge of pus appears at the end of the penis. The passage of the blood in the urine is called hæmaturia, and is common in bilharzia.

Symptoms of Nervous Disease.

The Brain and Meninges.—If the brain and its covering meninges are affected, the chief symptoms are **headache,** vomiting and a paralysis of one side of the body (hemiplegia). There may also be some difficulty in speaking. The **intelligence** may be seriously affected so that the patient becomes a lunatic; he may show extreme excitement known as mania, or he may be depressed. He may have mistaken ideas which are called delusions. The brain is frequently disturbed during a febrile illness; this is called delirium. Delirious patients toss and turn on the bed, and their speech is meaningless.

The Spinal Cord ("Anatomy and Physiology," Chapter II.).—Motor and sensory tracts run in the spinal cord. Disease of the spinal cord therefore commonly causes **paralysis** and **anæsthesia** of the lower parts of the body, and at the same time the action of the bladder is disturbed, so that retention of urine may occur. Large bedsores may form over the back, for here the parts have lost all their sensation.

The Nerves.—The nerves of the limbs contain efferent (motor) and afferent (sensory) fibres. When they are injured by disease, the limb or limbs may show **paralysis** and **lack of sensation.**

Sense Organs.—The eye and the ear are supplied with special sensory nerves. Disease of these nerves results in blindness or deafness, without any obvious change in the eye or the ear. Blindness and deafness are seldom due to nervous disease; but are usually due to destruction of the sense organ.

Summary.

Scientific medicine has grown slowly by:

1. Accurate observation of symptoms and signs.
2. The discoveries in the kindred sciences of anatomy, physiology, and chemistry.

It finds out:

1. The laws which govern health and disease.
2. It obeys and controls these laws by means of nursing and drugs.

Diagnosis:

1. Is the most important part of medical treatment.
2. If correct, the treatment is easily found out; if incorrect, the treatment is always in error.
3. Is obtained by a consideration of the symptoms and signs and laboratory reports.

History:

1. Encourage the patient to give his own account of the illness.
2. Supplement this by direct questions.
3. Many difficulties due to language and unintelligent patients render this work difficult, but do not affect its importance.

Pain.—Ascertain:

1. Position as accurately as possible, especially its area of greatest severity.
2. Severity by finding how it interferes with sleep, pleasure and work.
3. Nature, translating as far as possible native symptoms into scientific terms.

Fever:

1. A sudden rise of temperature shows itself by a rigor and subsequently by a sensation of warmth.
2. A slow rise of temperature shows itself only by a sensation of warmth.
3. All fever is often accompanied by headache, pain in the limbs, loss of appetite and constipation, and possibly by sweating and delirium.

Loss of weight accompanies:

1. Severe fever, especially if continued long, as in typhoid and pulmonary tuberculosis.
2. Cachectic disease—chronic malaria, helminths, cirrhosis, and chronic nephritis.
3. Any disease which interferes with feeding or digestion—*e.g.*, marasmus in babies.

Chest Symptoms:

1. Pain, the position of which is often suggestive of the disease.
2. Cough, dry or productive or paroxysmal.

3. Sputum and hæmoptysis.
4. Dyspnœa, usually due to anæmia or heart failure.
5. Palpitations, which are seldom a sign of heart disease.

Abdominal Symptoms:

1. Pain—its position, character, and relationship.
2. The bowels—constipation, diarrhœa, dysentery.
3. Vomiting, nausea, lack of appetite, and pain in the upper abdomen are common in many diseases, and seldom indicate disease of the stomach.
4. Distension, which may be found on examination, due to fæces, flatus, fluid, fœtus, fat, or tumours. Other patients feel but do not appear to be distended.

Œdema:

1. Heart failure—first in legs; second, lumbar; third, ascites.
2. Nephritis—first, face; second, all parts of body.
3. Anæmia, especially that associated with ancylostomiasis.

Genito-urinary Symptoms:

1. Kidney—may be pain in the loin, often painless; œdema.
2. Bladder—frequent painful micturition.
3. Urethra—discharge, pain during micturition.
4. Hæmaturia—bilharzia.

Nervous Symptoms:

1. Cerebral—Headache, vomiting, hemiplegia, lunacy.
2. Spinal cord—Paralysis and anæsthesia of legs, retention.
3. Peripheral nerves—Paralysis and anæsthesia of one or many limbs.

Questions.

1. Discuss how the native system of medicine differs from that of the European.
2. State why diagnosis is important. Give examples.
3. Make a list of the common questions asked in the history of:
    - (*a*) A chest case.
    - (*b*) An abdominal case.
    - (*c*) A genito-urinary case.
4. What different symptoms occur in the sudden rise of temperature of malaria and the slow rise of temperature of typhoid ?
5. Name the common chest diseases, and draw a diagram to illustrate where the pain of each disease occurs.
6. Name the parts of the alimentary tract; state what disease may occur in each part, and describe the pain which occurs in each disease.
7. Describe by means of a diagram the three important parts of the nervous system, and show on the diagram how disease produces the symptoms of nervous disease.

CHAPTER II

COMMON SIGNS OF MEDICAL DISEASES

General appearance—Temperature—Pulse—Respiration—Sputum—Vomit—Stools—Urine.

The General Appearance of the Patient.

Its Importance.—The general appearance of the patient tells more than anything else. It shows if a patient is seriously ill. It says if he is getting better or if he is getting worse. It reveals if a patient is in great pain. By itself, therefore, the general appearance answers more questions, more important questions, than any other single part of the examination. Yet it is frequently neglected. The thermometer, microscope, the stethoscope are all valuable instruments. They are all valuable aids to diagnosis, yet none of them can tell us as much about the patient as one long look into his face.

Its Meaning.—It is extremely difficult to describe in a book all that is implied by the phrase "general appearance." There is something about the appearance and the **expression** of a patient which tells an experienced dresser just how the illness is progressing. It is written largely on the face, which may suggest pain, tiredness, quiet, peacefulness, anxiety, or even impending death.

The **eyes** express much. Examples are the anxious eye in severe abdominal sepsis, the bright glistening eye of a case of high fever, the sleepy drowsy eye of a toxic case, the lifeless eye of a dying case.

The **position** or attitude in which the patient lies, sits, stands, and walks can tell much. There is the patient who sits up to tell us he is better. There is the patient who sinks down into the bed, for his strength is failing. There is the curled-up position so typical of meningitis and head injury, accompanied often by a strange wailing cry. Lobar pneumonia and pleurisy patients often lie on the affected side. The typhoid patient lies on his back, his eyes staring into space, his hands restlessly moving, trembling, and picking at the bedclothes.

The **tongue** and the lips show important signs. The tongue is furred in constipation, in abdominal disease, and in all serious fevers. It may be coated with white or yellow fur, and even more serious is the appearance of brown fur. A dry tongue is extremely serious. The **lips** become dry and cracked in all fevers, and should attract the attention at once if the patient is seen for the first time as an out-patient. Dirty-brown material called " sordes " gathers on the lips and teeth of patients who suffer from a severe and prolonged fever. Finally, the **nutrition** of the patient should be considered in the general appearance. Any person who is abnormally thin is almost certainly seriously ill. In addition, the skin is usually dry and the hair is soft and straighter than normal.

The Temperature.

Normal Temperature.—During health the temperature of the body may vary between 97° and 98° F. The average temperature is 98·4° F., but it is seldom actually just at this one particular point. Skin temperatures are usually less than the mouth temperature, being often 1° or 2° lower. Fever may be said to be present if the mouth temperature is over 99° F. A subnormal temperature is present in shock and collapse in which the temperature is below 97° F. The whole question of temperature, the clinical thermometer, and how to take the temperature is discussed in " Nursing," Chapter VII.

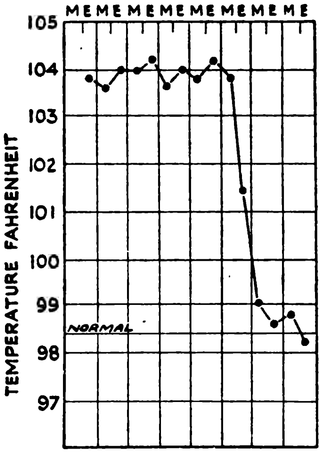


FIG. 3.—CONTINUOUS FEVER, TERMINATING BY CRISIS, AS IN LOBAR PNEUMONIA. (B.)

High Temperatures.—Any temperature over 99° F. may be taken as proof of fever. **Slight fever** is said to be present if the temperature is between 99° and 102° F. **High fever** means a temperature between 102° and 104° F. **Hyperpyrexia** indicates a temperature over 104° F., and is definitely dangerous.

Varieties of Fever.—1. **Continuous fever** indicates that the fever continues all the time. It is often high. This is typical of lobar pneumonia (Fig. 3) and of typhoid fever.

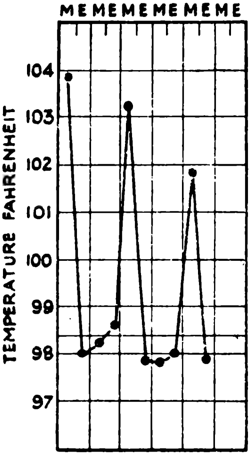


FIG. 4.—INTERMITTENT FEVER, RISING EVERY SECOND DAY, AS IN B.T. MALARIA. (B.)

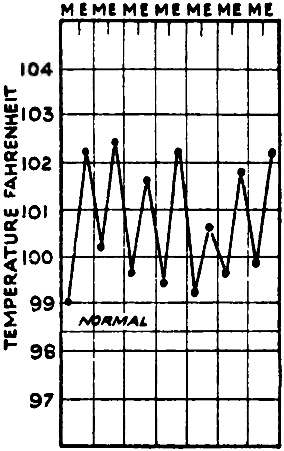


FIG. 5.—REMITTENT FEVER, RISING EVERY EVENING, AS IN SEPTIC DISEASES. (B.)

2. **Intermittent fever** varies much from hour to hour and from day to day. Sometimes it is high, sometimes it has fallen to below normal. It is common in malaria (Fig. 4).

3. **Remittent fever** indicates that although the temperature varies much, being usually low in the morning and high in the evening, yet it never falls to normal. It is common in broncho-pneumonia, in

pulmonary tuberculosis, and in severe septic illness (Fig. 5).

4. **Irregular fever** is actually more common than either of the three preceding types. In it the fever varies much from day to day and cannot be classified as one of the three recognized classes.

The Cause of Fever.—In health the body maintains the same temperature because the heat formed by the combustion of the food exactly equals the heat lost from the body. Heat is given off in the breath, from the skin, and even more important is the loss of heat due to the evaporation of sweat from the skin. There appears to be some complicated arrangement of reflexes by which the two forces, heat production and heat loss, are kept equal and the temperature remains about 98·4° F. During fever **heat production is increased** by the excessive combustion of the fuel stores of the body, chiefly those found in the fatty tissues. During the commencement of fever heat loss is decreased. Less blood circulates through the skin, which feels cold and is cold. At the same time the inner temperature is rising. Later during fever blood circulates freely through the skin, which is therefore hot.

The Reason for Fever.—The body appears to be able to protect itself better against bacteria and parasites if its temperature is raised. Fever is, therefore, a **method of defending** the body. Other changes occur, most of which also aid the body. The heart beats more quickly and more forcibly. The skin usually sweats freely to encourage the loss of heat. The stomach is unable to digest food, so vomiting is common and the appetite is always decreased. The decrease in the amount of food taken explains very largely the constipation. The loss of sweat explains why the urine is small in amount, concentrated and dark. Fever is therefore not a disease. It is a method by which the body reacts to many different diseases. It will only cease when the disease has been overcome.

The Termination of Fever.—High continuous fever may end either suddenly (that is, by **crisis**) or slowly (that is, by **lysis**) (Fig. 6). If it terminates suddenly by crisis, the temperature drops abruptly to normal within a period of twenty-four hours. The patient often sweats freely, has a sound sleep, and awakes feeling much refreshed. In lysis the temperature takes a few days to reach the normal line. The former is common only in lobar pneumonia; the latter is common in many diseases, such as broncho-pneumonia and typhoid. This descent of the temperature during crisis or lysis is always a favourable sign. In it the general condition and pulse improve. It must be distinguished from collapse, in which a fall in the fever also occurs, but at the same time the general condition becomes markedly worse and the pulse becomes weak and rapid.

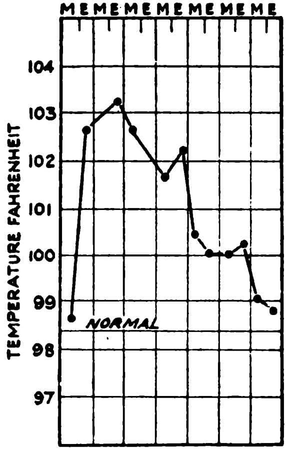


FIG. 6.—FALL BY LYSIS. (B.)

Treatment of Fever.—1. **Find the cause** and treat it.

2. **Rest** in bed.

3. The appetite is the best guide to the amount of **food** which can be digested. In severe fevers the patient usually desires only milk, soup, tea, and gruel. Hard food is not tolerated. In the intestinal diseases of typhoid, diarrhœa or dysentery it may

be necessary to order and insist on a fluid diet, even if the patient wishes to take more solid food.

4. **Plenty of fluid** is absolutely essential. Water, milk, fruit drinks, tea, soup, everything containing water is good.

5. Encourage **sweating** by a daily bath.

6. Few **bedclothes** are required. In hot climates the patients may lie practically naked.

7. A **purgative** or an **enema** may be given if the patient is constipated for two days. It is a mistake to purge too freely.

8. Hyperpyrexia is dangerous. The temperature must be reduced to at least 101° F. by **cold sponging** ("Nursing," p. 18).

Collapse and Shock.—These are very similar conditions in which there is a sudden, severe, and often fatal lowering of all the vital activities of the body. Some doctors restrict the term "collapse" to medical illness—thus, a pneumonia patient may show collapse—and the term "shock" to surgical complaints; thus, after a severe injury or operation the patient is said to be in a condition of shock. There is, however, no essential difference between the two conditions. In both of them the depression of the vital activities shows itself in many ways, one of which is a severe lowering of the body's temperature.

The **temperature falls** to 96° or 95° F. It follows that an abnormally low temperature is not always a good sign. In fact, if in a febrile illness the temperature falls and the **pulse-rate rises,** this indicates that the condition of shock or collapse is occurring and a fatality is feared. If the temperature falls because the disease is decreasing, then at the same time the pulse-rate falls and the general condition improves. In this way these two very different conditions may be distinguished; on the one hand there is a fatal collapse causing a subnormal temperature, and on the other hand there is the natural cure of a febrile illness and the falling of the temperature to normal.

The Pulse.

The pulse is usually counted in adults at the wrist, where lies the radial artery. In babies it is much better to feel for the brachial artery on the inner side of the arm. They are accustomed to being handled in this position and do not resent it. (The method of counting and recording the pulse is discussed in " Nursing," p. 37.)

The Rate.—From sixty to eighty beats a minute is the normal pulse-rate. If constantly below sixty it may be regarded as **slow.** This is seldom a serious sign. The pulse is seldom slow; the only common condition to produce this is a **fracture of the skull** and compression of the brain. If above eighty the pulse is **fast.** This occurs in healthy persons during hard physical exercise and in states of nervousness and fear. A fast pulse is found in all **fevers,** in **heart failure, hæmorrhage, anæmia,** in **shock** and **collapse,** and in any severe **toxic state.** A rise in the pulse-rate is therefore always a serious sign, and is of far more importance than changes in the temperature.

The Force.—In health the pulse has a certain normal force which is an approximate guide to the force of the heart's contraction. The pulse is more **forcible** at the commencement of most fevers. The pulse becomes **weak** or thready when the heart is failing, so that this is an extremely important sign. Later on it may even be imperceptible at the wrist. Unskilled persons who try to count the fast thready pulse are apt to miss some of the small feeble beats, and thus underestimate the rate.

The Regularity.—If a pulse is irregular, this is due to some irregularity of the action of the heart. This is sometimes, but not always, a serious sign. It should always be reported.

The Respirations.

The Rate.—The normal rate is from sixteen to twenty a minute. Young children and babies breathe normally at a faster rate than adults, so that in them it may be thirty a minute. The rate is increased in all fevers, especially that of lobar pneumonia. ("Nursing," p. 40, discusses the respirations and the recording of them on the chart.)

Varieties of Respirations.—1. **Shallow respirations,** which are also rapid, occur in pneumonia.

2. **Difficult breathing,** called dyspnœa, occurs in heart failure and in asthma.

3. **Stertorous respirations**—that is, loud snoring breathing—are heard only in deep coma.

4. **Wheezing respirations** are musical, and occur in bronchitis and asthma.

5. **Grunting respirations** are heard in lobar pneumonia, in which a grunt accompanies each painful respiratory movement.

6. **Bubbling respirations** signify that the bronchial tubes are full of fluid.

7. **Sighing respirations** occur in severe hæmorrhage.

The Sputum.

Sputum is largely mucus which is formed in the bronchial tubes as a result of any irritation. Pus or blood may also escape and become mixed with the mucus, so that the following varieties are seen clinically. ("Nursing," p. 31, also discusses the significance of the sputum.)

1. **Thin mucoid sputum,** containing practically no pus. It is common in pharyngitis.

2. **Thick muco-purulent sputum,** consisting of much pus mixed with the mucus. It is common in all severe inflammations of the respiratory system, bronchitis, broncho-pneumonia, influenza, tuberculosis, and in some cases of lobar pneumonia.

3. **Rusty sputum** is the colour of iron rust. It is also extremely sticky. The colour is due to the presence of blood, and if this is plentiful the sputum is bright red and may be called hæmorrhagic. These varieties are only common in lobar pneumonia. Hæmorrhagic sputum also occurs in pneumonic plague.

4. **Nummular sputum** is thick muco-purulent sputum which settles in water into a flat coin-like shape. It is produced in the cavities that form in the lungs of advanced cases of pulmonary tuberculosis.

5. **A hæmoptysis** is not really sputum, but is the expectoration of pure blood either in large or small amounts. It occurs in pulmonary tuberculosis, in aneurysm of the aorta or in heart failure. The commonest cause of a large hæmoptysis is pulmonary tuberculosis.

The Vomit.

The Cause of Vomiting.—Vomiting occurs in a large number of different conditions. It is common at the commencement of all **fevers,** and is an indication that the stomach cannot digest its contents, but requires a fluid diet.

Vomiting is common in the early stages of **pregnancy,** but it may become excessive and be a source of danger to the patient. Vomiting is common in diseases of the alimentary tract, especially the **diarrhœa** of young children, and it is always present and extremely severe in cases of intestinal **obstruction.** Vomiting occurs in injuries of the **brain** and in diseases of the **meninges.** (" Nursing," p. 32, also discusses vomiting.)

The vomit may contain the following:

1. **Food.**

2. **Bile.**—This appears as a greenish-yellow colour and is extremely bitter to taste. Uneducated persons often report this to be blood. It is common in severe attacks of malaria.

3. **Fæces.**—This causes the vomit to be dark in colour and to smell like fæcal material. Fæcal vomiting only occurs in intestinal obstruction.

4. **Blood.**—This is called a hæmatemesis. It is rare in Africans.

5. **Roundworm.**—This is the only large worm which can be vomited.

The Stools.

(" Nursing," p. 27, also discusses the stools.)

1. **The Number.**—Persons vary much in the number of stools passed each day. Many Africans pass two or three stools each day as a result of their bulky diet. They fear that they are constipated if they pass only one stool a day. As a rough general rule, constipation can be considered to be present if one complete day passes without any action of the bowels. In diarrhœa and dysentery the stools are frequent in number.

2. **The Amount.**—This depends largely on the amount of food eaten. The diet is reduced in a large number of conditions, such as fever, in which the stool will be small in amount. This cannot be called constipation and does not require the administration of purgatives.

3. **Consistency.**—Hard stools are passed in constipation. Soft stools occur in diarrhœa and watery stools in severe diarrhœa.

4. **Colour.**—A pale white stool occurs in certain forms of jaundice. Green stools are common in babies who are suffering from diarrhœa. A young baby

who is breast-fed should have a yellow stool. If it is fed on cow's milk, the stool tends to be a pale yellow.

5. **Mucus and Pus.**—These appear in cases of dysentery.

6. **Blood.**—Bright red blood appears in dysentery, bilharzia, and in hæmorrhoids of the rectum. When blood escapes from the small bowel, as from a typhoid ulcer, it appears as a black colour in the stool, and is called **melæna.**

7. **Helminths.**—The commonest worm to be seen in the stool is the tapeworm, which appears as white segments. The roundworm is passed commonly by children as a reddish-brown roundworm about the length and thickness of a pencil. Small threadworms may be seen like white threads moving on the surface of the stools. Hookworms are not seen by a patient or dresser in the stool.

The Urine.

(" Nursing," p. 29, discusses the urine, and the testing is described on p. 168.)

1. **The Urine in Fever.**—It is decreased in amount, dark in colour, acid in reaction, and a reddish deposit of urates may form on standing. A trace of albumen may be present. The colour is apt to be mistaken by some patients for that of blood.

2. **The Urine in Gonorrhœa.**—The urine should be passed as two equal specimens into two separate glasses. If only the urethra is infected, the first specimen is cloudy and the second is clear. If the bladder is infected, both specimens are equally cloudy. The cloudiness is due to the presence of pus, and it does not become clear after the addition of dilute acetic acid, which, however, will dissolve any cloudiness due to phosphates. Pus should be identified by the microscope.

3. **Bilharzia.**—The patient usually has several

attacks of hæmaturia. During an attack the urine contains bright red blood. The bilharzia ova are found by examining the last few drops of urine, which should be collected separately. Albumen is always present.

4. **Urinary Infections.**—Infections of the bladder and kidney apart from gonorrhœa are not common. Any infection will cause the passage of a cloudy urine. It is cloudy as soon as it is passed, and it often has an offensive smell. These points help to distinguish it from the white cloudiness of phosphates which tend to be deposited in an alkaline urine which has stood for some hours. Phosphates dissolve in acetic acid, pus does not.

5. **The Urine in Acute Nephritis.**—The specific gravity is over 1,015. The urine is decreased in amount. The urine is sometimes smoky in colour because of the presence of small amounts of blood. A large amount of albumen is present. Microscopical examination reveals casts; these are small rod-like objects which have come from the inflamed kidney tubules.

6. **The Urine in Chronic Nephritis.**—The specific gravity is usually under 1,015. Only a trace of albumen is present. A few casts are usually found.

7. **The Urine in Jaundice.**—It is a dark greenish-brown colour. The bubbles which form on the top of the urine have a greenish tint. This is due to the presence of bile.

8. **The Urine in Diabetes.**—The specific gravity is usually over 1,030. Sugar is present.

Summary.

The general appearance of the patient:

1. Is the best guide as to the severity of the illness.
2. Includes the facial expression, the attitude, the tongue and the nutrition.

The temperature is:

1. 97° to 99° F. in health.
2. Below 97° F. in collapse or shock.
3. Above 99° F. in fever.
4. Above 104° F. in hyperpyrexia.

Fever may be classified into:

1. Continuous fever, often high.
2. Intermittent fever, sometimes normal.
3. Remittent fever, sometimes high, sometimes low, never normal.
4. Irregular fever.

Fever is due to:

1. A reaction on the part of the body to protect itself against bacteria.
2. Increased combustion of carbohydrates and fat.

The Treatment of Fever:

1. Find the cause and treat it.
2. Rest.
3. Fluid diet and excess of fluids generally.
4. Cold sponging for hyperpyrexia.

The Pulse:

1. Rapid in fevers, heart failure, hæmorrhage, shock, and collapse.
2. Weak in a failing heart.
3. Slow pulse in compression of the brain.

The Respirations:

1. Rapid, shallow, painful breathing in lobar pneumonia.
2. Dyspnœa in heart failure and asthma.

The Sputum:

1. Thick muco-purulent in bronchitis, broncho-pneumonia and tuberculosis.
2. Rusty and sticky in lobar pneumonia.

Vomiting:

1. Seldom a sign of disease of the stomach; usually due to other diseases affecting the stomach,

such as fever, pregnancy, head injuries, meningitis, or the diarrhœa and vomiting of children.

2. Vomit may contain food, bile, fæces, blood, or a roundworm.

The Stools:

1. Frequent and watery in diarrhœa.
2. Frequent, mixed with blood, mucus, and pus, in dysentery and bilharzia.

The Urine:

1. Febrile. Concentrated, high specific gravity, dark; trace of albumen.
2. Gonorrhœa and urinary infections. Trace of albumen and pus.
3. Nephritis. Albumen and casts.

Questions.

1. Write a description of the appearance of the patient in a severe fever like that of typhoid.
2. Draw temperature charts to illustrate (*a*) crisis in the continuous fever of lobar pneumonia, (*b*) lysis in the remittent fever of broncho-pneumonia. Insert pulse and respiration rates.
3. Describe the general treatment of a patient with malarial fever.
4. How is the pulse affected in (*a*) heart failure, (*b*) fever ?
5. Describe the respirations and the sputum in (*a*) lobar pneumonia, (*b*) pulmonary tuberculosis.
6. How does an examination of the stool help the diagnosis of (*a*) dysentery, (*b*) bilharzia, (*c*) jaundice, (*d*) diarrhœa ?
7. In what conditions may albumen be found in the urine ?

PART II.—SURGICAL DISEASES

CHAPTER III

THE GENERAL PRINCIPLES OF SURGICAL DISEASES

Examination of surgical cases—Causes of surgical disease—Injuries—Wounds—Infected wounds—Bacteria—Antisepsis—Asepsis—The treatment of inflammation.

The Distinction between Medical and Surgical Disease.

MEDICAL diseases are treated by the administration of drugs, which are either swallowed in the form of a mixture, powder, or tablet, or are injected into the body. Surgical diseases are treated by other methods, such as operations, dressings, splints, or objects of a similar nature.

The Examination of a Surgical Case.

The History.—In the more simple surgical diseases the history is not as important as in medical complaints. Often two questions are sufficient, the first concerning the nature and length of the illness, the second concerning how it commenced. These questions are sometimes neglected when the diagnosis appears obvious, but many mistakes arise in this manner. A leg may appear swollen due to an abscess, but the history may prove that it is really a fracture. Even when the diagnosis appears extremely obvious, such as in a leg ulcer, the history may explain the cause and influence the treatment. For example, if the ulcer has been present for a year, it is unlikely to be cured quickly and demands admission to hospital. More complicated surgical diseases like that of a strangulated hernia require as careful questioning as a medical case. The questions asked vary from one disease to another, and cannot be conveniently summarized as in medical illnesses.

The Examination.—The patient must remove all the clothes from the affected part. Most patients are apt to resent this, but it must be insisted on. More mistakes are made because the affected part cannot be examined properly than through lack of skill. This is especially true of venereal diseases, which the patients are apt to conceal.

The Inspection.—When the affected part is undressed, it is inspected. This may appear extremely simple, but the experienced eye learns to detect many small points which escape the attention of those less skilled.

The Palpation.—Palpation means the examination of the affected part to ascertain what can be felt with the fingers. If there is an open wound, sinus, or ulcer, this may not be advisable. Any swelling should be palpated so that a more accurate idea may be obtained concerning its size, shape, consistency, fluctuation, or tenderness.

Special Tests.—Wounds may in certain circumstances be probed. It may be necessary to test the function of a part, such as testing the movements of a joint.

The Causes of Surgical Diseases.

1. **Injury,** producing wounds, bruises, hæmorrhage and burns.
2. **Bacteria,** producing septic diseases such as leg ulcer, boils, abscess, and septic wounds.
3. **Obstruction** of the tracts of the body, intestinal obstruction, and stricture of the urethra.
4. **Tumours.**—These are new growths of tissue.

Injuries.—The Repair of Injuries.—All injuries commence suddenly, and there is usually a history of a fall or some blow. The body is, however, prepared to repair all injuries, and immediately after the injury this process of repair commences. The symptoms of pain and the signs of injury usually start to decrease immediately. Naturally, if the injury be severe, like that of a fractured femur, many days will pass before the improvement is obvious. If bacteria enter the injured part, acute inflammation occurs, and the process of healing is delayed.

Wounds.

1. **Bruise** (Fig. 7).—A bruise is due to a violent blow by something not sharp enough to cut the skin. Small bloodvessels which lie deep to the skin are torn, and blood oozes into the subcutaneous tissues. Treatment consists in applying cold lotions, like lead and opium, and bandaging the part with firm pressure.

2. **Abrasions.**—These occur when an injury rubs away the superficial layers of the skin. They are speedily healed by hot fomentations, which help to remove any dirt which has been rubbed into the wound. Antiseptic ointments or oily fluids may also be applied.

3. **Incised Wounds.**—These are produced by sharp cutting instruments. Their skin edges are sharply cut and straight. They may bleed freely, due to cut bloodvessels in the depth of the wound. If treated correctly soon after they are received, they often heal by first intention and do not become septic.

4. **Lacerated Wounds.**—These are caused by rough and blunt instruments exerting a tearing action on the skin. The wounds have torn, irregular edges,

and they contain many corners in which infecting material may lie. For these reasons they are difficult wounds to cleanse or to stitch, and they frequently become septic. They can only be cleansed under an anæsthetic, and are usually not stitched.

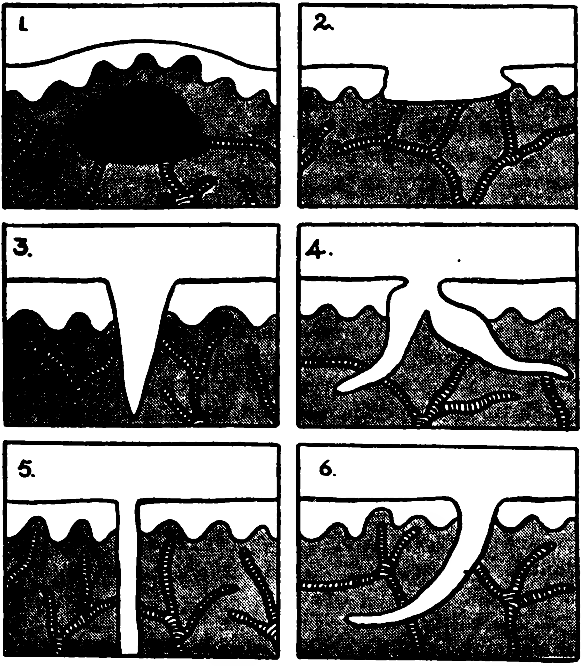


FIG. 7.—A DIAGRAM TO ILLUSTRATE DIFFERENT VARIETIES OF WOUNDS.

1. Bruise; 2, abrasion; 3, incised wound; 4, lacerated wound; 5, stab wound; 6, maul. (A.)

5. **Stab Wounds.**—A sharp pointed instrument like a knife or a spear can produce a stab wound. They

easily pierce deep organs, such as the heart, lungs, abdominal organs, or deep bloodvessels, and are thus dangerous to life. When inspected, they may appear insignificant wounds, but consideration of the instrument used will show that they may be deep. It may be necessary to probe the wound, but this should be avoided if possible, since it may carry infection into the deeper parts.

6. **Mauls.**—Wild animals tear the skin and subcutaneous tissues with multiple stab and lacerated wounds. These always become extremely septic, for the claws and teeth of the animal always contain many infecting organisms. These wounds are laid open under an anæsthetic; they are cleansed, but no attempt is made to stitch them.

The Healing of Clean Wounds.—If a wound is clean —that is, it contains no infecting bacteria—certain changes occur, all of which are stages in its cure. Blood flows from the cut vessels, thus washing the wound with a sterile fluid which neither irritates nor damages the injured tissues. This blood clots in the depths of wounds; this closes the bleeding vessels. It also clots on the surface of the wound, forming a tough adherent sterile dressing. The cut ends of the subcutaneous capillaries send out little buds of new capillaries into the clotted blood, and these grow into all parts of the wound and are easily seen on the surface of a clean healing ulcer. They are called granulation tissue. These granulations slowly change into tough fibrous tissue which binds together the two sides of the wound. Meanwhile the skin grows across the surface of the granulations. Healing is now complete, the body having healed itself. All that can be done to aid this process of repair is to stop any severe hæmorrhage and to remove bacteria or any foreign bodies which have entered when the injury was produced.

The Treatment of Clean Wounds.—When a wounded patient is received as an out-patient, uncover all the wounds and inspect them thoroughly. A probe may be used to explore the depths of a wound if it is uncertain how deep it runs. It also informs us whether deep structures like bones or bloodvessels are involved, or if a foreign body like a splinter of wood is present. Needless to say, the surface of a wound should be sterilized first, as probing tends to carry infected material from the surface of the wound into its depth. For this reason probing is avoided whenever possible. This examination of the wound will enable the dresser to decide how the patient can be treated. Large wounds need skilled surgical attention, and are admitted to hospital for an immediate operation. Small wounds may be stitched and treated as out-patients. Lacerated wounds are often not stitched.

The Stitching of Recent Clean Wounds.—The following articles are required:

Clean table or dressing trolley.
Swabs in an antiseptic lotion.
Artery forceps, needles, catgut, and silkworm gut sterilized by heat or placed in an antiseptic lotion.
Skin antiseptic lotion (tincture of iodine or picric lotion).
Kidney tray for dirty dressings.
Large square tray.
Mackintosh.
Dressings of sterile gauze and cotton-wool.
Bandages.

When everything is ready, remove any dressings from the wound. Wash your hands thoroughly. If the skin is very dirty, wash it with boiled water and soap. If it is hairy, shave it. Paint it with the skin antiseptic. Your hands have become dirty, and now require to be washed again. Open the edges of the wound and remove any blood clot, dirt, and foreign bodies by means of a swab soaked in antiseptic lotion. Small bloodvessels may be tied in the following manner: Grip the oozing vessels with the tips of the artery forceps and ligature with catgut. When all the bleeding has ceased, stitch the skin with silkworm gut. Apply once more the skin antiseptic. Apply a gauze dressing, using it dry if it has been recently sterilized; if not, soak it in an antiseptic lotion. Cover with cotton-wool and bandage. Sulphonamide powder is often placed in a wound just before it is stitched in order to prevent sepsis.

The Treatment of Large Wounds.—Cases are admitted to hospital and prepared immediately for operation. In the theatre three principles of treatment are followed: Firstly, the dirty skin edges and loose pieces of subcutaneous tissue and muscles are excised. Secondly, large bleeding bloodvessels are ligatured. Thirdly, cut muscles, tendons or nerves are repaired by sutures. Fractured bones may be cleaned up and placed in the correct position. If the wound on admission is obviously septic or the injury occurred more than twelve hours previously, this treatment is considerably modified, since its main purpose is to prevent sepsis. These injuries are treated as an infected wound, for sepsis is regarded as inevitable.

The Dressing of Wounds.—This is set forth in "Nursing," p. 45.

Infected Wounds.

Infection delays Healing.—Wounds heal quickly in about a week if the skin edges are brought close together and the wound remains free of infection.

If bacteria enter and multiply in a wound, it is said to be septic or inflamed. The instrument which inflicted the wound may have been the cause of the infection or the surface of the skin may have contained bacteria which were carried down into the depths of the wound. Subsequently dirt or flies may infect the surface or the application of a dirty dressing may produce the infection. The signs of infection are those of inflammation.

The Signs of Inflammation:

1. **Pain.**
2. **Swelling.**
3. **Heat.**
4. **Redness,** not seen under a dark skin, but obvious in an inflamed eye.
5. **Loss of function.**
6. **Pus.**

These signs occur anywhere in the body where infection occurs. In addition to their appearance in infected wounds, they are also seen in other diseases of acute inflammation, such as conjuctivitis, cellulitis and a boil.

The Changes in Inflammation (Fig. 8).—When inflamed tissues are studied under the microscope, the following changes are observed: Bacteria are seen to be multiplying in the centre of the area and are being carried into the surrounding tissue. The **bloodvessels dilate** (Fig. 8 [2]), and many capillaries which previously were closed open to admit as much blood as possible to the inflamed area. This causes the redness and swelling, and the part is said to be congested with blood. From these swollen capillaries **white blood cells** escape into the surrounding tissues. They move towards the bacteria, surround and destroy them (Fig. 8 [2] and [4]). Many of the white cells are, however, destroyed in the process, and form **pus,**

which is largely composed of the destroyed white cells. Certain parts of the tissues may be destroyed

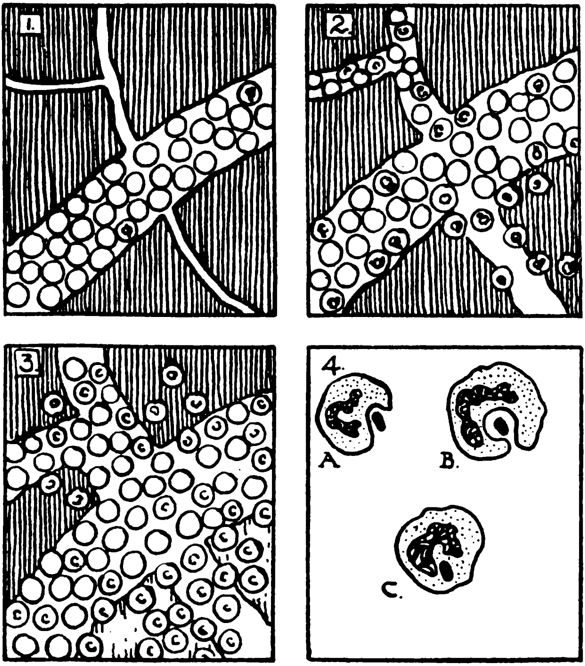


FIG. 8.—A DIAGRAM TO ILLUSTRATE THE CHANGES IN ACUTE INFLAMMATION.

1, Normal tissue; 2, inflammation—early changes; 3, inflammation—late changes and abscess formation; 4, large-scale illustration of a white blood cell ingesting a bacterium. (A.)

by the bacteria, and are dissolved away (Fig. 8 [3]). Large parts of destroyed tissue will form a white **slough.** Pus accumulates until eventually it forces itself through the skin and is discharged on the surface of the body. In other cases the pus is slowly absorbed. The inflammation then decreases, the bacteria are destroyed and sloughs slowly separate. The cavity produced by destruction of the tissues is filled by granulation tissue, which is in turn replaced by fibrous tissue. (Other aspects of inflammation are discussed in " Anatomy and Physiology," p. 169.)

The Effects of Inflammation on the Other Parts of the Body.—The bacteria form poisonous substances, called toxins, which are absorbed into the bloodstream and circulate all over the body. They produce the symptoms of **toxæmia**—fever, rapid pulse, malaise, and headache. If some of the bacteria enter the blood stream and multiply in it, a more serious condition occurs, one called **septicæmia** (p. 72). High fever, rigors, a very rapid pulse, and severe toxæmia occur. The general appearance of the patient becomes worse and death usually occurs.

Bacteria.

The Pyogenic Bacteria.—(The classification of bacteria, their growth, and their effect on the body are also discussed in " Anatomy and Physiology," p. 164.) Pyogenic bacteria are those which produce pus. They are the common causes of surgical inflammation.

1. *Staphylococcus.*—This germ causes localized abscess formation, and is found in a boil, infected wounds, certain septic skin diseases, and many abscesses.

2. *Streptococcus.*—This germ tends to cause widespread inflammation, as in cellulitis, infected wounds, sore throats, puerperal sepsis, and septicæmia.

3. *Pneumococcus.*—This germ is the cause of

pneumonia and bronchitis, but occasionally occurs in surgical inflammation.

4. *Bacillus coli.*—This germ is normally present in the intestines, where it is harmless. It is often present in peritonitis.

5. *Gonococcus.*—This germ is peculiar in that it can only cause inflammation in the urethra (gonorrhœa), the conjunctiva and joints.

The Destruction of Bacteria.—Bacteria are destroyed either by the use of poisonous substances, called antiseptics, or by heat. The question of the sterilization of the instruments and dressings is considered in " Anatomy and Physiology," p. 163, and again in " Nursing," p. 43, but the subject is so important that it will be revived once again.

Antisepsis.

The process of killing bacteria by the use of antiseptics is called antisepsis. Common examples of antiseptics are carbolic, lysol, perchloride, and biniodide of mercury, eusol, potassium permanganate, boric acid, spirit, acriflavine, picric, and iodine. Although these are all similar in their destruction of bacteria, they differ from one another in their efficiency and in their effect on the body, or on instruments or dressings which come into contact with them. Certain ones like boric acid are mild in their action, and are therefore used in the eye, which would be irritated by strong antiseptics. Others like picric and iodine are stronger, and are used on the skin. Others like the mercury antiseptics tarnish certain metal instruments. It follows that in different diseases different antiseptics are employed because they have been found to be most suitable. Antiseptics are seldom applied, unless they are extremely weak, to the depths of a wound, neither are they swallowed nor injected. They destroy all living objects, even the tissues of the body. Antiseptics are chiefly used to sterilize instruments and dressings. Before an instrument can be sterilized it must be cleaned thoroughly. Unless this is done, the instrument is not sterilized, but contains dirt, pus or blood-clot which has not been penetrated by the antiseptic. It is extremely difficult to remember this in a busy ward or dispensary. Instruments which have been used on a septic case are sometimes dipped into an antiseptic for a few moments, and are used immediately on another case. This is incorrect, because the instrument is not sterilized and it transfers the infection from one case to another.

Asepsis.

Antiseptics are therefore not as effective in the destruction of bacteria as might be hoped. They cannot be used inside the body, and they cannot sterilize dirty instruments. It has been found that better results are obtained by preventing bacteria from entering clean wounds. This is called asepsis. It relies on excluding bacteria, not by the use of antiseptics, but by cleaning everything as thoroughly as possible and by sterilizing by means of heat. Asepsis is employed in a theatre, where all the instruments and tables are scrupulously cleaned and polished. Heat is used either to boil the instruments or as steam by which the dressings are sterilized. Antiseptics may also be employed, but the chief object of asepsis is to exclude bacteria rather than to destroy them with antiseptics once they are present.

Sterilization in Dispensaries.—Asepsis is the better method of sterilization, but it demands strict rules for its success. This may be possible in a theatre, but it is not possible in a dispensary or an out-patient clinic. It employs heat, which is usually expensive. Antisepsis is therefore employed in dispensaries, and there is practically no attempt to follow the strict rules of asepsis as practised in a theatre.

The Treatment of Inflammation.

Rest.—The inflamed part must be rested in every possible way. It can be bandaged, placed in a sling or into splints, or it may be rested in bed. All work of the inflamed part is forbidden and restricted as far as possible. If the inflammation is severe and toxæmia is causing fever, rest in bed is essential.

The Removal of Pus.—Pus is a collection of dead white blood cells and of bacteria. It is best to remove it from the body by washing the inflamed part with sterile saline or with a mild antiseptic lotion. Abscesses may be incised with a scalpel and drained through a rubber drain. Occasionally leg ulcers are strapped, and appear to do very well, although all the pus is retained. Similarly infected wounds and compound fractures are treated in closed plaster of Paris. There are exceptions to the rule. It seems that absolute rest, the antiseptic properties of pus and absence of interference are responsible for the cure. Boils are not now incised; they are covered with adhesive plaster under which they resolve.

Heat.—The application of heat brings more blood to the part, and thus more white blood cells arrive to destroy bacteria. Hot baths and hot foments or a hot-water bottle are all used for this reason.

Strong Salt Solutions.—Strong saline solution and packs of magnesium sulphate draw the fluids from the tissues out towards the concentrated solution. This washes out the wound. Antiseptics may be used when the surface of the body is inflamed, as in an ulcer of the leg. They will destroy bacteria but at the same time unfortunately irritate the tissues.

Sulphonamides.—The sulphonamides can be taken internally. They are absorbed and travel in the blood-stream to the inflamed part. Here they prevent the bacteria from increasing in number.

Summary.

The Examination of a Surgical Case.

1. The history: duration, mode of onset.
2. The examination: inspection and palpation.

The Causes of Surgical Disease.

1. Injury: wounds, bruises, fractures, burns, hæmorrhage.
2. Bacteria: ulcers, abscesses, septic wounds.
3. Obstruction: intestinal obstruction, stricture of the urethra.
4. Tumours.

Varieties of Wounds.

1. Bruise, treated by cold lotions and by pressure bandaging.
2. Abrasions, treated by hot foments.
3. Incised wounds, easily stitched, easy to prevent infection.
4. Lacerated wounds, difficult to stitch, always infected.
5. Stab wounds, damage to deep structures, hæmorrhage.
6. Mauls, never stitched, always become infected.

The Healing of Wounds.

1. Blood clots in the wound and arrests hæmorrhage.
2. Clot invaded by young capillaries—red granulation tissue.
3. Capillaries change into fibrous tissue binding edges together.
4. Skin grows from the edges across the granulation tissue.
5. Sepsis delays healing by causing inflammation.

Stitching of Recent Clean Wounds.

1. Remove all the dressings. Wash your hands.

2. Sterilize the skin by washing, shaving, and by picric or iodine. Wash your hands.
3. Wash out the wound with weak antiseptic lotion. Ascertain the extent of the damage.
4. Tie deep bloodvessels with artery forceps and catgut.
5. Stitch skin edges with silkworm gut.
6. Paint with picric or iodine. Apply dressing. Bandage.

The Signs of Inflammation.

1. Pain.
2. Swelling.
3. Heat.
4. Redness, not seen under a dark skin.
5. Loss of function.
6. Pus.

The Changes in Inflammation.

1. Bloodvessels increase in number and in size.
2. White cells escape from dilated capillaries into inflamed tissue.
3. Bacteria destroyed by white cells.
4. Pus formed by death of many white cells.
5. Pus removed by abscess bursting, or it is slowl absorbed.

Complications of Inflammation.

1. Toxæmia from absorption of toxin. Fever, rapid pulse, malaise.
2. Septicæmia if bacteria invade and multiply in blood stream. High fever, rigors, death.

Pyogenic Bacteria of Surgical Inflammation.

1. Staphylococci in localized infection: boil, abscess, infected wounds.
2. Streptococci in widespread infection: cellulitis, septicæmia.

3. Pneumococci: not a common cause of surgical inflammation, causes pneumonia, etc.
4. Bacillus coli: peritonitis.
5. Gonococci: gonorrhœa.

Antiseptics.

1. Poisonous action on bacteria, if strong enough and allowed to act for certain length of time.
2. Cannot clean dirty instruments, which must be cleaned first.
3. Largely used in dispensaries owing to simplicity of use.

Asepsis.

1. Aims at excluding bacteria.
2. Employs scrupulous cleanliness, heat, and demands strict discipline.
3. Is the better method, but is more difficult and costly to follow.

Treatment of Inflammation.

1. Rest of the diseased part, possibly of the entire patient.
2. Remove pus, the washing of wounds, incision, and drainage of abscesses.
3. Heat relieves the congestion and increases the circulation of the blood.
4. Strong salt solutions and packs attract fluid from the inflamed tissue.
5. Antiseptics are of some value in inflammation of the surface of the body.
6. Sulphonamides prevent the growth of bacteria.

Questions.

1. A patient comes with a swollen foot. Describe how the case is examined.
2. Describe, with suitable examples, the common causes of surgical diseases.
3. What is happening in inflamed tissues, and how

does this explain the known signs of inflammation ?

4. State why asepsis is used in a theatre, but antisepsis is used in a dispensary.
5. How are infected wounds treated ?

CHAPTER IV

COMMON SURGICAL DISEASES

Ulcers—Burns—Hæmorrhage—Shock—Sprains—Fractures.

Ulcers.

WHEN the skin or the lining of the food canal is destroyed by inflammation an ulcer appears. An ulcer is an open sore which discharges pus. A deep penetrating sore which discharges pus is spoken of as a sinus, and not as an ulcer.

Ulcers may be produced by wounds, sepsis, burns, bedsores, and also by such diseases as yaws and syphilis. Ulcers occur in the mouth in stomatitis. Ulcers inside the body are very rare except in the diseases of dysentery and typhoid, in which most patients know nothing concerning the ulcers, which are present in the bowels.

Leg Ulcer (Tropical Ulcer).

It is not clearly understood why so many Africans but so few Europeans get leg ulcers. Most of them start as small injuries which become septic. These are incorrectly treated by native medicines and tied up with leaves or a dirty rag. Dust enters and flies crawl on it. Some doctors believe that poor food, yaws, and syphilis aid the occurrence of leg ulcers.

Position.—The ulcer is found on what might be called the small sock area—that is, that part of the leg which would be covered by a small sock, such as Europeans wear. It is well known that this part of the body is frequently injured. It also has a

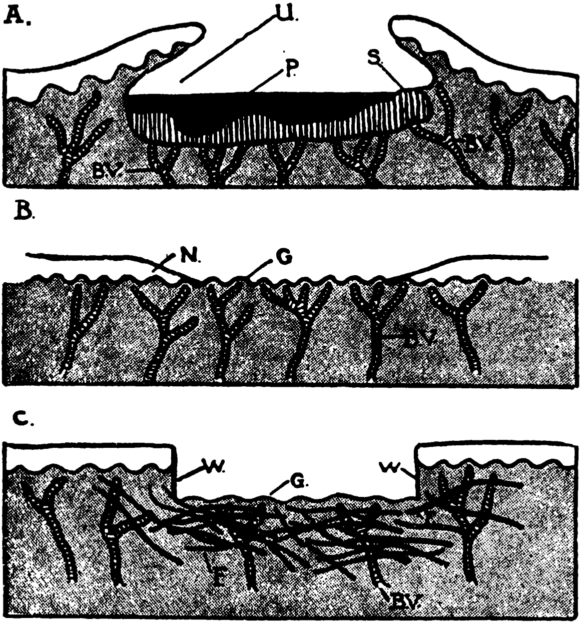


Fig. 9.—A Diagram to Illustrate the Different Varieties of Ulcers.

A, Spreading; B, healing; C, stationary; P, pus; S, slough; U, undermined edge; BV, bloodvessels; G, granulations; N, new skin; W, steep wall; F, fibrous tissue. (A.)

very poor circulation of blood, being the lowest part in the body, and so farthest from the heart. Part of the treatment is to raise the foot by making the patient rest in bed, thereby improving the circulation.

Description.—There is usually only one ulcer. When first seen, this is probably spreading; later it may heal when the correct treatment is applied. Some ulcers refuse to heal, and are called stationary. It is important to be able to tell whether an ulcer is spreading, is healing, or is stationary (Fig. 9).

A spreading ulcer is painful. It has a raised undermined edge (U), under which the tissue is excavated and pus is formed. Here the skin is being destroyed. It discharges thick pus (P), often mixed with blood; this discharge has a foul smell. The floor is formed of soft dead tissue and black or grey sloughs (S).

A healing ulcer is not very painful. The edge is flat, and a thin layer of pink new skin (N) slopes down to the floor of the ulcer. The floor contains clean red buds of granulation tissue (G). It does not discharge thick pus, but only a little clear fluid.

A stationary ulcer stands still. It gets neither better nor worse. It has a steep wall (W) of skin. Surrounding the ulcer is a very hard ring of fibrous tissue (F), in which the bloodvessels have been destroyed. This explains why it does not heal. This ring must be removed by scraping or by excision at an operation before healing can take place.

Treatment.—The treatment of a leg ulcer is really that of inflammation. There are many different methods of treatment. Whenever any one disease is treated by different doctors in different ways, one can be quite certain that none of the methods are very good or quick. This is true for leg ulcer, many of which are very slow in healing.

1. **Spreading ulcers** are treated by hot foments, hot baths and Mag. Sulph. packs. Strong antiseptics may be painted on the ulcer, or the ulcer may be scraped under an anæsthetic. Almost any dressing regularly applied will clean the ulcer; the only

difficulty is to get it to heal and to heal quickly. Rest in bed helps the healing. Many doctors, however, find that the ulcer when clean will heal when covered with adhesive plaster, and that this can be left on a few days or weeks, depending on the amount of discharge. Plaster of Paris is also used.

2. **Healing ulcers** heal slowly if they are kept clean. Adhesive plaster has been already mentioned, and is probably the best dressing. Hot foments and mild antiseptic lotions are often used. Strong antiseptics and packs injure the young skin and delay healing.

3. **Stationary ulcers,** which are surrounded by a fibrous ring, will heal only when this has been removed by scraping or, better still, when it has been excised with the scalpel.

Finally, certain leg ulcers are caused by syphilis and yaws. They may be above the small sock area and can occur on any part of the body. They do not often have a regular round edge. They look as if several small ulcers have joined together; they often heal in one part, leaving thin, pale skin, and spread in another part. They will heal only when the syphilis or yaws is treated. Some doctors believe that syphilis and yaws may prevent the ordinary leg ulcer (tropical ulcer) from healing, and give injections to every case. The treatment of leg ulcers is a most important part of the work of almost all dispensaries. Common faults are that the patient does not attend regularly, the ulcers are not dressed in a clean manner, and the hot fomentations are not really hot.

Burns.

Burns are injuries of the skin produced by fire and by other hot objects. Hot liquids, such as boiling water, produce scalds, but these are practically the same as burns. A severe burn destroys all the skin, which will then come away and leave a large ulcer having skin only at the edges. A slight burn does not kill all the skin; only the epidermis is destroyed and may come away, but small pieces of skin remain. These grow and soon spread over the granulation tissue, so that the burn soon heals. Persons who suffer from epilepsy often get severe burns.

Signs.—Slight burns produce blisters, which can be pricked to remove the fluid. Underneath are the deeper parts of the skin which have not been destroyed, so that healing is rapid. Deep burns do not cause large blisters. The whole of the skin dies and comes away as a slough. These burns are very painful and produce much shock.

Treatment.—If the burn is large, the first thing to do is to treat the person for shock (p. 60); that is, rest, warmth and fluids are required. A burn is a special kind of wound, which heals quickly if it does not become septic. It easily becomes septic because the part is damaged and has a poor resistance to bacteria. The treatment of a clean burn is the treatment of a clean wound, but if it becomes septic the treatment is changed to that of a septic wound.

As long as a burn remains clean, a large number of antiseptics can be used to prevent it becoming septic. Picric solution is probably the commonest. The antiseptic is mixed with an oil, such as paraffin, glycerin or castor oil, to prevent the dressing from sticking. Equal parts of picric lotion and castor oil make an excellent dressing. Dress a clean burn once a day.

Tannic acid is the modern treatment for large clean burns. It may be applied as a wet dressing or sprayed on to the burn. It is probably the best treatment we have at the present time. It changes the surface of the raw flesh into a hard brown crust like leather, which prevents shock and sepsis.

Most burns reach hospital when they are septic. Hot baths, hot fomentations and eusol dressings overcome the sepsis, and the treatment is that of a septic ulcer.

Hæmorrhage.

Hæmorrhage means the loss of blood from the body. The common cause is injury.

Varieties.—There are many varieties of hæmorrhage, depending on how the whole matter is treated. First there will be discussed those varieties which depend on which type of bloodvessels are cut, whether they are arteries, veins or capillaries (Fig. 10). According to the three kinds of injured vessels, so hæmorrhage is classified into arterial, venous or capillary hæmorrhage.

Arterial hæmorrhage is always severe and much blood is lost. The heart pumps the blood into the arteries, along which it travels both quickly and forcibly. Sometimes, but not often, the actual artery can be seen to spurt blood; usually its cut end is lying hidden at the bottom of the wound. Arterial hæmorrhage can usually be stopped by a pad on the wound, but, if this is unsuccessful, pressure is required on the vessel between the heart and the wound. The surgeon stops arterial hæmorrhage by ligaturing the bleeding vessel.

Venous hæmorrhage is seldom severe. In the veins the blood flows slowly. Venous hæmorrhage is much more common than arterial hæmorrhage, since the veins lie just beneath the skin, while the arteries are deep. Venous hæmorrhage usually ceases if the actual wound is bound up tightly, but this will not always stop arterial hæmorrhage. Veins have soft walls, which are easily compressed, so that

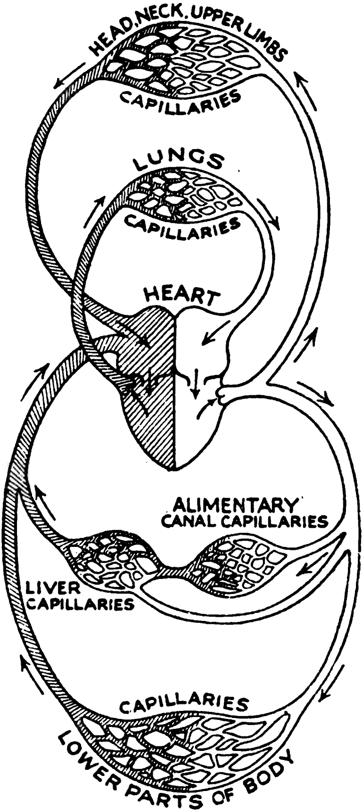


FIG. 10.—DIAGRAMMATIC SCHEME OF THE CIRCULATION, SHOWING ARTERIES (RIGHT), CAPILLARIES (CENTRE) AND VEINS (LEFT). (B.)

pressure soon stops the hæmorrhage. Venous hæmorrhage is made worse by pressure between the wound and heart; it is improved by pressure below the wound—that is, further away from the heart.

Capillary hæmorrhage is never severe. Drops of blood drip from the whole cut surface.

This represents one method of classifying the different varieties of hæmorrhage. Another method classifies them according to the time at which the hæmorrhage occurs. Immediately after the wound is received, **primary** hæmorrhage occurs. If the wound is severe the patient goes into a condition of shock; when reaction occurs and the shock is overcome, the wounds may bleed again; this is **reactionary** hæmorrhage. This sometimes occurs in operation cases who return from the theatre in a condition of surgical shock. When the shock has passed and the patient is becoming conscious, the hæmorrhage may commence once again, so that the dressing becomes soaked with blood. Wounds which become septic may have yet a further bleeding which occurs about ten days later. About this time the sloughs separate and open up arteries. As this hæmorrhage is secondary to sepsis, it is called **secondary** hæmorrhage.

Yet another method of classifying hæmorrhage depends on its position. **External** hæmorrhage is obvious to everyone, but it must not be forgotten that a person can bleed into the pleural cavity from a fractured rib tearing the lung, or into the abdominal cavity from a ruptured spleen. These are **internal** hæmorrhages; no blood is of necessity seen outside the body, yet the person frequently dies from loss of blood.

Special varieties of internal hæmorrhage, in which some blood appears outside the body, will now be mentioned. If blood is coughed up, it is called **a**

hæmoptysis. The common cause is tuberculosis. Blood may be vomited; it is then called **hæmatemesis.** Bleeding from the large bowel in dysentery, bilharzia, or any other disease, produces red blood in the stools. No special name is given to it. Bleeding from the small bowel does not appear in the stool until a day later. The blood has changed to a black colour, and is called **melæna.** This may occur in typhoid fever. Women may lose much blood at a child-birth. The common cause is that the placenta does not come away, and this type of bleeding is called **post-partum hæmorrhage.** Blood lost in the urine is called **hæmaturia.** It is common in diseases of the urinary organs, particularly bilharzia.

Symptoms and Signs.—Hæmorrhage, unless it is internal, is easily seen, but sometimes operation cases bleed under the bedclothes and no one thinks about lifting them.

If the loss of blood is severe, certain signs appear. They should always be looked for, since it is sometimes very difficult to tell if much blood has been lost. For instance, a little blood can make a lot of mess, but the patient may be in no danger. On the other hand, much blood may be lost before it is discovered, yet little may then be seen, but the patient is in real danger. The best indication of the severity of the hæmorrhage is the pulse-rate. If under 100, the patient is not in danger; if between 100 and 120, danger is present; if over 120, grave danger is present.

The colour of the blood remaining in the body becomes pale after a severe hæmorrhage. This change in colour can be seen in the tongue, the gums, the lips, or in the conjunctivæ under the eyelids. The patient feels cold and he is cold. The temperature is subnormal. He may faint and lie quiet, or he may be restless and move and twist on the bed.

Treatment.—All capillaries, all veins, and even small arteries close and stop bleeding when a dressing or pressure pad is applied firmly. If the hæmorrhage then continues, we may safely say, even if we cannot see, that arterial hæmorrhage is present. To stop arterial hæmorrhage quickly pressure must be applied between the wound and the heart. First-aid methods, such as pressure on the appropriate pressure points, or the application of the tourniquet, as taught in a first-aid course, must be applied until arrangements are made for surgical measures. The only cure for arterial hæmorrhage is to tie the cut vessel with catgut or thread.

If much blood has been lost, the patient requires general treatment in addition to the local treatment of the bleeding part. Rest in all its forms is necessary. Morphia may be ordered by the doctor as an injection. Saline given into the rectum or the veins will help. Warmth in every way is good. Hot drinks, especially those containing sugar, are excellent.

In internal hæmorrhage no local treatment can be applied; general treatment alone can be attempted.

Shock.

Severe injuries such as wounds, operations, fractures and difficult labour produce shock. It is due to great pain, injured muscles, and it is increased by loss of blood.

In severe medical diseases such as pneumonia or typhoid the patient may very suddenly become worse and die. He is in a condition of collapse, which can be regarded as very similar to that of shock.

Symptoms and Signs.—The symptoms and signs of shock are similar to those of hæmorrhage, except that in shock, as much blood has not been lost, the conjunctivæ and gums are not pale. The patient is very ill, he is cold, and the pulse is rapid.

Treatment.—The treatment of shock resembles the general treatment of hæmorrhage. The patient must be rested in bed, the foot of which may be lifted on blocks so that the brain and the heart get as much blood as possible.

Get the patient warm as quickly as possible. Put on more blankets. Give hot-water bottles, remembering, however, that it is very easy to burn a shocked patient by a hot-water bottle next to the skin. It is essential to give plenty of fluids either as hot drinks of sweet tea or coffee or as an intravenous saline. If shock is severe and the blood pressure is very low, give a transfusion of blood or of plasma. An injection of morphia is given if the pain is severe.

Sprains.

A sudden injury to a joint slightly tears some of the ligaments which bind the joint, thus causing a sprain.

Symptoms and Signs.—The patient feels sudden and severe pain in the joint. He finds that he cannot move it, as *all movements are extremely painful.* The joint is swollen and tender, especially just over the torn ligaments. *All movements are very painful,* especially those which will pull on the torn ligament.

Treatment.—A sprain is a special form of internal wound. Ligaments, however, may take from four to six weeks before they become firmly united and can bear the strain of use. Rest helps the ligaments to heal. Bind up the joint with cotton-wool and a firm bandage, or strap the joint. The sprained joint should not be used much at least for a week or two, possibly for longer.

An injection of procaine into the strained ligaments can be a very effective form of treatment and allows the patient to use the affected joint immediately.

Fractures.

A bone is broken because it is not strong enough to resist the effects of injury. It may break because the injury strikes directly on the bone, smashing it just where it is struck. It may, however, break because the injury strikes a distant part, such as occurs when a fall on the palm of the hand breaks the clavicle.

Varieties (Fig. 11).—**Simple** fractures (A) are those which have no wound which communicates with the fractured part. Bacteria cannot enter and the fractured bone cannot become septic. Like all clean wounds, it heals as quickly as possible.

Compound fractures (B) are just the opposite. They have a wound leading down to the fractured parts of the bone. Bacteria can enter and the bone can become infected. An infected bone is always a very serious condition. It may be fatal. All the signs of inflammation occur. The bone does not heal until the sepsis is overcome.

Transverse fractures (1) run straight across the bone.

Oblique fractures run (2) in a sloping direction.

Comminuted fractures (3) contain many small pieces of broken bone.

Depressed (4) fractures are common only in the skull, which is pushed inwards, thus injuring the brain.

Complicated fractures (5) are associated with damage to arteries, nerves or muscles.

Greenstick fractures (6) are, as the name suggests, incomplete.

Impacted fractures (7) occur when the two fractured parts are driven forcibly together.

Symptoms and Signs.—The patient always feels very severe pain, which commences suddenly, as if something has broken. This pain always lasts a month, often, indeed, two or three months, but becomes progressively less. He notices the signs which will now be described.

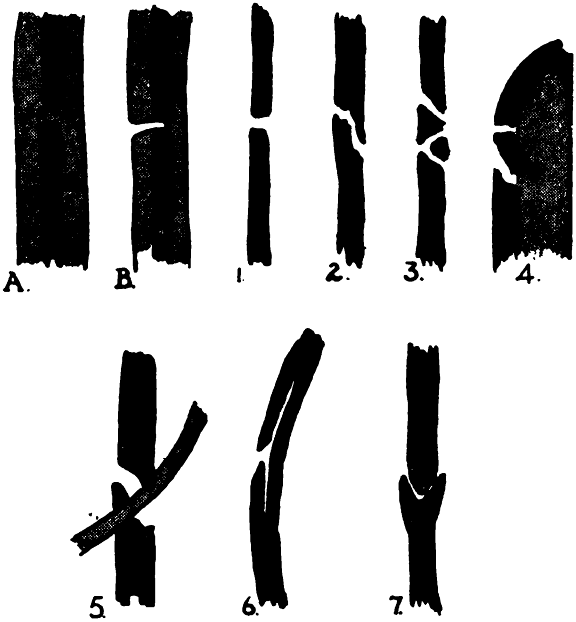


Fig. 11.—Diagram to Illustrate the Different Varieties of Fracture.

A, Simple; B, compound; 1, transverse; 2, oblique; 3, comminuted; 4, depressed skull fracture 5, complicated fracture injuring bloodvessel; 6, greenstick; 7, impacted. (A.)

1. **Pain** has already been mentioned.

2. **Tenderness** is always felt, and is very severe just over the line of the fracture, where it is worse than anywhere else.

3. **Swelling** always occurs, due to the escape of blood around the fractured ends of the bone.

4. **Deformity.** The part may be an unnatural shape.

5. If the two ends of the bone are now firmly gripped and gently pressed towards one another, very great pain occurs, and it is sometimes possible to feel the broken ends of the bone scraping one against the other. This resembles the feeling felt when two stones grate on one another, and is called **crepitus.** It may even be possible to bend the limb in a way which would be quite impossible unless a fracture is present. This is spoken of as **unnatural mobility.** All this handling of the limb must be performed very gently, and should not be done if it is certain that a fracture is present.

Treatment.—First-aid treatment is taught elsewhere. The treatment of almost any fracture is a difficult matter, and should not be performed by a dresser unless it is absolutely impossible to send the patient to a doctor. A dresser may, however, assist a doctor in the treatment of a fracture, so the general rules for their treatment are now given.

1. **Place the Broken Ends in the Correct Position.**—If they are in the correct position, nothing is done. If they are not, then they must be placed forcibly in the correct position—that is, the fracture must be *reduced*. If this is not done the broken pieces heal in a deformed position. The fractured pieces of bone may be forced into position under an anæsthetic, or they may be pulled into position slowly by the method of extension, in which the limb is pulled straight in a Thomas's splint.

2. **Hold the Broken Pieces in the Correct Position.**—This is done by means of a splint or by continuing to pull on the extended limb in a Thomas's splint. An ordinary splint can hold bones in the correct position if the fracture has been already reduced,

but they cannot reduce the fracture. This explains why native methods of treating a fracture often leave a deformity.

3. **Help the Limb to regain its Function.**—If a limb is bound up for too long, the muscles become stiff and adhere to one another. Then, even if the bone has healed, the limb cannot be used. If the fracture is not bound up long enough, the bone may bend where it is still soft at the site of the fracture. No rule can be made concerning the length of time a fracture should remain in a splint; only a doctor can decide. As a rule the arm is let out of splints early, for it has to bear no weight, and it is necessary to be able to move the arm easily. The leg is kept longer in splints, for the bone must be hard before it bears the weight of the body.

The stiff muscles are loosened by persuading the patient, even if it hurts, to allow the dresser to bend and straighten the joints. Later on the patient must be encouraged to move and use his own limb.

Summary.

Ulcers :

Due to wounds, sepsis, burns, bedsores, syphilis and yaws. Intestinal ulcers in dysentery and typhoid.

Leg Ulcer :

Cause—Not clearly known; injury, infection, poor blood supply are factors.

Position—Small sock area of lower leg.

Spreading ulcer—Undermined swollen edge, pus, pain, sloughs.

Healing ulcer—Sloping, pink edge, clean granulations.

Stationary ulcer—Steep wall, hard edge, no improvement.

Treatment: Spreading ulcer—Heat, rest, hypertonic packs and lotion, eusol.

Healing ulcer—Rest; keep clean with almost any harmless dressing.

Stationary ulcer—Excise fibrous edge.

Burns:

Due to hot objects; scalds due to hot fluids.

Causes varying degree of destruction of skin.

Signs—Blisters in superficial burns, charring in deep burns.

Shock is severe in extensive burns.

Treatment—For shock: heat, fluids, rest, morphia, tannic acid to the burn.

For the burn: tannic acid or picric if recent burn; if septic, treat as septic ulcer.

Hæmorrhage:

Arterial—Severe, rapid, may be fatal. Treated by pressure either locally or between the heart and the wound.

Venous—Seldom severe, slow. Treated by local pressure.

Capillary—Surfaces ooze blood. Arrests itself.

Primary—At the time of the original injury.

Reactionary—When reaction occurs a few hours after the initial shock.

Secondary—About tenth day, due to separation of septic sloughs.

Signs of severe hæmorrhage—Pulse, rapid; temperature, subnormal; mucous membranes, pale.

Treatment—First-aid, pressure by a dressing or pad or the fingers. Ligature of vessels.

Shock:

Due to severe injuries and increased by hæmorrhage.

Signs—Patient appears very ill, feels cold, and rapid pulse.

Treatment—Absolute rest, warmth, fluids, morphia.

Sprains:

A sudden injury partially tears the ligaments of a joint.

Sign—Painful swelling of joint following injury.

Treatment—Rest and support.

Fractures:

Simple—No communicating wound, heal rapidly.

Compound—A communicating wound.

Transverse, oblique, comminuted, depressed, complicated, greenstick, and impacted fractures.

Symptoms and signs—Pain, tenderness, swelling, deformity, crepitus, unnatural mobility.

Treatment—

1. Reduction, if necessary by anæsthetic.
2. Fixation in splints, plaster, etc.
3. Restoration of function of limb.

Questions.

1. Describe in detail the different appearance of the edge, the floor, and the discharge of (*a*) a spreading, (*b*) a healing, and (*c*) a stationary ulcer.
2. What is the treatment of a severe burn seen within an hour of its being received ?
3. Classify hæmorrhage according to the time at which it occurs after the initial injury. Explain in each variety why the hæmorrhage occurs.
4. What are the signs of a fracture of the femur ?
5. Explain the principles which underly the treatment of a fractured femur in a Thomas's splint.

CHAPTER V

SPECIAL VARIETIES OF INFLAMMATION

Boil — Cellulitis — Abscess — Septic adenitis — Tuberculous adenitis — Septicæmia — Arthritis — Chronic rheumatism —Diseases of bone.

Boil.

Definition and Cause.—One of the common bacteria which produces surgical inflammation also causes a boil. The germs enter the roots of a hair and cause a small abscess.

Signs.—In the skin a small lump appears which has all the signs of inflammation. It is painful, burning and swollen. In a few days pus bursts through the skin, and then later a small yellow slough comes away.

Treatment.—Hot foments, three times daily, or antiphlogistin are a great help. It should not be incised. If many boils continue to appear, the doctor should be consulted.

Cellulitis.

Definition and Cause.—Cellulitis is an acute inflammation of the tissues which lie between the skin and the muscles. It is caused by one of the ordinary bacteria of surgical inflammation. Any part of the body may be affected.

Signs.—The whole of the skin over a large area is felt to be thick, for it is swollen, it is hot, tender and very hard.

This swelling, which starts suddenly, may clear up in about a week without any pus forming. On the other hand, pus may form over a wide area between the skin and the muscles, and will in the end burst through the skin. Cellulitis can be a severe form of inflammation. It may kill. Cellulitis usually occurs around a wound which may be large or very small, even a prick with a thorn. At other times no wound can be seen in the skin. Fever will be present at least during the first few days. Malaise may be severe.

Treatment.—Rest the patient in bed, and rest the diseased part as much as possible. Hot baths three times a day may be used. Antiphlogistin may be applied once daily. Pus may be drained by an incision. Sulphonamide drugs help the body to overcome the infection. The sulphonamides should be used.

Abscess.

Definition and Cause.—When acute inflammation attacks any part of the body, pus is formed. This pus may pass along one of the internal tracts, such as occurs in gonorrhœa, bronchitis, and bacillary dysentery. On the other hand, if some solid organ of the body is attacked, the pus collects in the centre of the inflamed part. This collection of pus is called an "abscess." It will increase in amount until eventually it bursts out of the body.

Varieties.—There are many varieties of abscess, depending on which part of the body is attacked:

1. **The ordinary abscess**—just under the skin.
2. **Lymphatic gland** abscess—perhaps the commonest.
3. **Dental** abscess—from a tooth.
4. **Pyomyositis**—an abscess in the muscle.
5. **Bone** abscess (osteomyelitis)—in a bone.
6. **Suppurative arthritis**—in a joint.
7. **Whitlow**—in the finger or hand.
8. **Abdominal** abscess—in the abdomen.
9. **Breast** abscess—in the breast.
10. **Pyosalpinx**—in the Fallopian tube.

Signs.—All the signs of acute inflammation are present—pain, swelling and heat. In addition there is a sign which proves the presence of pus. The centre of the hard inflammatory mass softens and **fluctuation** is detected. To test for the fluctuation of fluid pus, place on the centre of the swelling the two index fingers so that they almost touch one another. Press one finger down, then the other finger is pushed upwards by the fluid. The test depends on whether the second finger is raised.

Treatment.—Most abscesses will cure themselves in time, for the pus bursts through the skin. Hot foments or antiphlogistin hastens this.

An incision may be performed when it is certain that pus is present. The skin is incised with a scalpel. If pus does not come out, a pair of sinus forceps can be pushed towards the centre of the abscess. They may open up the cavity. A scalpel should never be used to cut deeper than the skin, for it may injure large bloodvessels. In large abscesses it may be necessary to insert a rubber drainage tube.

Septic Adenitis.

The Function of the Lymphatic Glands ("Anatomy and Physiology," pp. 78 and 79).—The body has many lymphatic glands. They are about the size of a bean. They lie in groups in certain parts of the body. They receive small tubes called the lymphatic channels, along which flows a white fluid called lymph. The fluid passes through the gland, enters another lymphatic channel and in the end reaches the large veins (Fig. 12).

Every lymphatic gland therefore receives lymph from a certain part of the body. The group of **axillary** lymph glands receives lymph from the arm and the nearest part of the chest wall. The group in the **groin** receives lymph from the leg, the abdominal wall, penis and scrotum. The group in the **neck** receives lymph from its own half of the head, face and mouth. Each group of lymphatic glands consists of about twenty separate glands.

When bacteria invade any part of the body, they are attacked by the white blood cells, but they may enter the lymphatic channels and are carried in the lymph to the nearest lymphatic gland. All the signs of acute inflammation occur in this lymphatic gland, which by trapping the bacteria has prevented the spread of the infection. There are special cells in the glands to destroy the bacteria, so that the infection soon decreases. Sometimes, however, pus forms—that is, an abscess occurs. The commonest abscess in the body is a lymphatic gland abscess.

Signs. — The lymphatic gland or glands suddenly swell and become painful. They are hot and tender. It is necessary to remember which part of the body is drained by the glands, and to search this part for some septic disease.

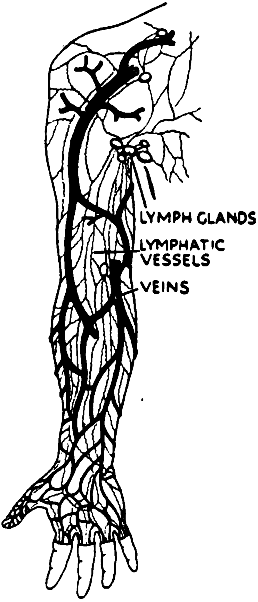


Fig. 12.—Lymphatic Vessels and Glands and Veins of the Arm. (B.)

1. **Groin glands**—Septic ulcer and wounds of the leg; syphilis and chancroids of the genital organs.
2. **Axillary glands**—Septic disease in the hand and arm.

3. **Neck glands, under the jaw**—Tonsillitis, caries, stomatitis.

4. **Neck glands, back of neck**—Septic disease of the scalp.

If pus collects in the glands, all the signs of an abscess occur—that is, in addition to pain, heat and swelling, the sign of fluctuation is now detected.

Treatment.—Treat the original septic disease—*e.g.*, leg ulcer or tonsillitis. Unless the glands are very large it is not necessary to treat them. If much pain or swelling is present, apply hot fomentations or antiphlogistin. If they suppurate, an incision may be necessary to evacuate the pus.

Tuberculous Adenitis.

Definition and Cause.—Tubercle bacilli may enter the mouth and travel to the glands under the jaw. This causes a chronic inflammation of the glands. After many months of swelling they may suppurate and form sinuses.

Signs.—The glands of the neck slowly enlarge, but no pain is felt. At first the glands feel soft, and they can be felt as separate glands. Later the glands become attached to one another and to the skin, and cannot be felt as separate glands. The glands are never tender and never hot.

Finally the glands soften, the pus bursts through the skin. Sinuses form, and last for many years.

Treatment.—An early operation should be performed to remove the tuberculous glands. This can cure the patient, but this is far more difficult once sinuses have formed.

Septicæmia.

Definition and Cause.—In inflammation the body is always trying to prevent the bacteria from spreading in the body. The bacteria may travel along lymphatic channels and cause septic adenitis. This is rarely serious. They may spread to the blood stream and multiply in it; this is called septicæmia. This is always serious and usually fatal. Septicæmia can therefore occur in any septic disease. In septicæmia every drop of blood contains many bacteria.

Signs.—In addition to the signs of the original septic disease, such as a bone abscess (osteomyelitis) or cellulitis, the signs of a blood infection occur. They are **rigors, high fever,** a **rapid pulse,** and the **general condition** of the patient becomes much **worse.** In fact, they are like malaria, which is a blood infection due to parasites. But a malarial temperature will drop when quinine is given; this does not occur in septicæmia.

Treatment.—The treatment of septicæmia is the treatment of fever and of any symptoms which may arise. The original septic disease is vigorously treated. The administration of the sulphonamides in the full dosage must be commenced at once.

DISEASES OF JOINTS

Arthritis.

Definition and Cause.—Arthritis means inflammation of a joint. There are many varieties, depending on the bacteria which cause the inflammation. There is the acute inflammation caused by pus-forming bacteria and the chronic inflammation of tuberculosis and chronic rheumatism.

Suppurative Arthritis.—This is usually due to a wound **which** communicates with the joint. A few days later all the signs of acute inflammation occur. The joint is extremely painful, so that the patient shouts when it is moved even very slightly. It is burning hot and swollen. High fever is present. The patient may die.

The doctor treats this very serious disease by draining the pus through an incision.

Gonococcal Arthritis.—About the time a patient with gonorrhœa is beginning to think that he is really cured he may get a sudden attack of arthritis in a large joint such as the knee. All the **signs** of acute inflammation occur—pain, swelling and heat.

Under the correct treatment the signs decrease up to a certain point, but it may be many months before the pain and swelling have disappeared.

Treatment consists in applying heat and absolute rest to the joint. In addition the sulphonamides must be given in full dosage and soon produce much improvement in the arthritis.

Tuberculous Arthritis.—Like all tuberculous disease, this has a slow onset and a chronic course. One large joint is commonly attacked—for example, the knee or the hip.

All the **signs** of joint disease develop slowly in the course of a few weeks or months. Pain is felt, and much movement of the joint causes pain. Swelling and heat are present. In the end sinuses may form. The disease persists until in the end the patient frequently dies.

Treatment consists in absolute rest to the joint for many months. Special splints or plaster of Paris may be used.

Chronic Rheumatism (Chronic Arthritis).

Definition and Cause.—The cause of this disease is not known. It seems as if, as we get older, the parts which move the body, such as the joints, tendons and muscles, cannot work as well as when we are young. They are wearing out. Poisons travel in the blood to these worn-out joints and produce signs of mild chronic inflammation. No bacteria are present in the diseased part, and pus never forms.

Symptoms.—The patient, who is usually an old man or woman, complains of pain in his joints. He may point to only one joint, but if he is questioned he will state that other joints have troubled him from time to time.

Signs.—The joint is usually slightly swollen. All movement is painful. There are often signs of arthritis in many of the joints.

Treatment.—No one can make the patient's joints young again, so it is a difficult disease to cure completely. The pain often disappears in one joint, but after a few months appears again in other joints.

The joint may be rested if severe pain or swelling is present. Too much rest for too long a period of time is not good, as it allows too much stiffness to occur.

Rubbing the joints with liniment decreases the pain. Scott's dressing is useful when the swelling is very painful. Internally aspirin, sodium salicylate and potassium iodide are taken.

Chronic Rheumatism in Muscles and Tendons.—Rheumatism can also attack muscles and tendons. The patient notices that certain muscles are painful (**myalgia**), and that they feel stiff. When they are moved the pain becomes worse. There is no obvious swelling. The pain passes in a week or two. **Gonorrhœa** is a very frequent cause of chronic rheumatism.

The treatment resembles that of chronic rheumatism in joints, liniment being applied externally and aspirin or other drugs being given internally.

DISEASES OF BONE

Like other parts of the body, the bones can be attacked by the common bacteria of acute inflammation, and pus forms in the bone (acute osteomyelitis). Chronic inflammation, due to tuberculosis, yaws and syphilis, also occurs.

Acute Osteomyelitis.

In a compound fracture bacteria reach the bone through the wound. Most cases of acute osteomyelitis have no wound; then the infection is brought to the bone by the blood.

Course of the Disease.—The patient suddenly notices very great and severe pain in one bone. The patient is usually a child or a young man, and the disease commonly attacks one of the long bones of the limbs, such as the tibia or the femur. The **signs** of severe acute inflammation appear quickly; great swelling, heat and tenderness occur. At this stage pus is forming inside the bone, but it will take about a week before it can burst through the bone to form an abscess in the muscles. Then another week may pass before it bursts through the skin.

During the first two weeks and before the pus is discharged from the body, high fever and rigors occur. Septicæmia may follow and the patient may die. When the pus has burst through the skin, the pain, swelling and fever all decrease.

A **sinus** forms where the abscess bursts, and slowly discharges pus for many months or years. The bone becomes much thicker, and within it are dead pieces of bone. Until these pieces are removed by a surgical operation the sinus cannot close. Patients usually arrive at hospital when they have had sinuses for many months; the beginning of the disease is not often seen except in the case of a compound fracture.

Treatment.—In the early stages the surgeon will open the bone and release the pus. Closed plaster of Paris is then applied, healing taking place under it.

Later, when sinuses have formed and refuse to heal, an operation is necessary to remove the dead portions of bone.

Tuberculous Bone Disease.

Tuberculous disease of bone is very similar to tuberculous disease of joints. Often the two diseases occur together, the disease commencing in one part of the bone or the joint and subsequently spreading to the other.

Course of the Disease.—The disease starts slowly with severe pain in a certain part of one bone. A swelling slowly appears. The bone is slowly being destroyed and pus is being formed. In the end a large abscess will form in the muscles or under the skin. It is called **a cold abscess,** being cold and painless. It is thus quite different from the usual abscess of acute inflammation, which is hot and painful. The abscess may burst into the joint, causing tuberculous arthritis. In the end the **abscess bursts** through the skin. A sinus forms and continues to discharge pus, usually until the patient dies. If a patient is seen at this stage of the disease, it may be impossible to distinguish between the sinuses of osteomyelitis and those of tuberculosis.

Treatment.—It is absolutely necessary to treat the case in hospital. Only there can the diseased bone be completely rested in plaster of Paris or in a special splint. **Rest** is necessary for at least six months. At the same time everything must be done by good food and fresh air to improve the health of the patient. A **cold abscess** must be treated by **aspiration.** Incision and drainage, as practised on an ordinary abscess, are not advisable and always produce a sinus. If a sinus has formed, it may be scraped and packed, but even then healing may be very slow or may not occur.

Pott's Disease.—This is tuberculous bone disease of the **spine.** The bones are slowly destroyed and the spine bends so that a protruding deformity appears in the back. Cold abscesses occur which may burst in the back or even travel to and burst in the groin.

Syphilis and Yaws in Bones.

From five to thirty years after syphilis or yaws enter the body—that is, in the late tertiary stages of these diseases—the bones may be slowly attacked by chronic inflammation.

The common bones to be attacked are the long bones of the limbs, the **tibia,** fibula, femur, radius and ulna. The commonest is the tibia.

Masses of hard bone may form on the surface (**periostitis**), or the whole of the bone (**osteitis**) may be swollen. It may bend as shown in the bent shin of **sabre tibia.** Abscesses and sinuses are rare, but if a lump of inflamed bone lies near the skin; an ulcer may occur. At the bottom of this ulcer lies white but dead bone.

Congenital syphilis may cause bony masses to appear on the skull of a baby, or the end of one of the long bones may show signs of inflammation (epiphysitis). Yaws or syphilis may attack the bones of the nose and the roof of the mouth. An ulcer forms and the parts are slowly destroyed. This is common in yaws, and is called **gangosa.**

Symptoms and Signs.—**Pain** is felt in the affected bone. Often more than one bone is affected. This may cause the disease to be confused with the limb pains of any fever or cachexia. In the latter conditions there is no swelling or deformity or tenderness of any of the bones.

The affected bone enlarges to form a hard **swelling.** Some pain and tenderness is present, but it is not as severe as in osteomyelitis. Sinuses are rare, but an ulcer may occasionally occur. Fever is usually absent, but slight evening temperature may occur.

Treatment.—The treatment for syphilis and yaws is applied—that is, N.A.B. and bismuth injections are given and potassium iodide taken internally (p. 192).

Summary.

Boil.

Due to an infection of a root of a hair.

Pus appears around the root and a small slough forms.

Treatment—Hot foments or antiphlogistin.

Cellulitis.

A severe inflammation of the subcutaneous tissues.

Signs—Acute inflammation occurs, with much painful swelling of the skin. Fever and malaise may be severe.

Treatment.—Rest, hot baths and sulphonamides.

Abscess.

A collection of pus due to acute inflammation.

Signs—Fluctuation is detected by testing with two fingers in the centre of the large acute inflammatory swelling.

Treatment—Drainage of the pus by incision and a rubber drain.

Septic Adenitis.

Due to the entrance of bacteria into lymphatic glands.

Signs—The glands enlarge, are painful, hot, and may suppurate. Search for the cause in the area drained by the glands.

Treatment—Treat the cause, hot foments to the glands.

Tuberculous Adenitis.

A chronic inflammation, usually of the glands of the neck.

Signs—Chronic painless enlargement of glands, which at first are separate, later are attached to one another. Sinuses form due to cold abscesses.

Treatment—Excision of glands before sinuses occur.

Septicæmia.

Bacteria present and multiplying in the blood stream.

Signs—In addition to the original septic disease, rigors, high fever and severe malaise occur. Usually fatal.

Treatment.—The sulphonamides are given freely and symptoms are treated as they arise.

Arthritis.

1. **Suppurative.**—Pus-forming bacteria which may enter penetrating wounds. The signs are extremely severe and the disease may prove fatal. Treatment consists in drainage.
2. **Gonococcal.**—During gonorrhœa severe acute arthritis may occur.
3. **Tuberculous.**—Chronic inflammation, usually of one large joint. Frequently fatal. Treated by absolute rest in plaster of Paris.
4. **Chronic Arthritis, Chronic Rheumatism.**—Unknown cause. Attacks several joints, muscles or tendons of old people. Treated by liniments, Scott's dressing, and internally by aspirin, sodium salicylate and potassium iodide.

Osteomyelitis.

Due usually to a blood-borne infection which causes acute inflammation of bone.

Signs—Acute inflammatory swelling over one of the bones, high fever; an abscess forms, bursts and leaves a sinus.

Treatment—An operation to drain the pus or to remove dead bone.

Tuberculosis of Bone.

Tubercle bacilli travel in the blood to a bone.

Signs—Chronic inflammatory swelling, cold abscess, sinuses.

Treatment—Absolute rest in plaster of Paris.

Syphilis and Yaws in Bones.

Chronic inflammation of bone occurs in the late tertiary stages. Periostitis results in bony masses on the surface. Osteitis results in generalized swelling of the bone.

Special varieties—Congenital syphilis affects the skull and the epiphyses, yaws causes gangosa in the nose.

Treatment.—N.A.B. and bismuth injections, potassium iodide.

Questions.

1. Describe how (*a*) an ordinary abscess, (*b*) a cold abscess forms. What is fluctuation and how may it be detected ?
2. Enlarged glands are found in the right groin. What may have caused this ? How are they treated if they suppurate ?
3. What different varieties of arthritis occur? Explain the cause of each variety.
4. How does tuberculosis affect (*a*) a bone, (*b*) a joint ? What signs would appear in tuberculosis of the knee joint ?
5. Describe the different manifestations of syphilis in bones.

CHAPTER VI

SPECIAL SURGICAL DISEASES

The acute abdomen—Abdominal injuries—Peritonitis—Intestinal obstruction—Hernia—Hydrocele—Swellings of the testis and epididymis—Prolapse of the rectum—Stricture of the urethra—Retention and incontinence—Tumours.

The Acute Abdomen.

THIS is a group of diseases which commence suddenly in the abdomen and require an immediate surgical operation in order to save the patient's life—that is, it is a surgical emergency. Any delay means death. All medical treatment is bad, and **purgatives are dangerous.**

There are many diseases which may be included under the heading of the acute abdomen, but three big classes are described here: those due to **injury,** those due to **infection** and those due to **obstruction.**

Abdominal Injuries.—Any wound which pierces the abdominal wall and enters the peritoneal cavity is dangerous to life. It may produce a fatal hæmorrhage into the cavity, but this is not common. The chief fear is that the intestines have been pierced and that septic fæces are entering the peritoneal cavity. Signs of severe **infection of the peritoneum** soon appear, and then it may be too late for an operation to succeed. As soon as possible after the injury the abdomen should be opened; the intestines may be sutured and the peritoneal cavity may be cleaned.

A large hæmorrhage can occur into the peritoneal cavity if the liver or spleen is torn by an injury. Crush injuries from a motor-car accident may tear the liver, but a blow with a stick or the hand may rupture an enlarged spleen. Pain is felt in the injured part of the abdomen, and all the muscles over this part become very hard and tender. Signs of internal hæmorrhage occur, such as a rapid pulse (p. 58). An immediate operation is essential.

Peritonitis.—Peritonitis occurs when pus forms in the peritoneal cavity. It may be due to **wounds** which penetrate the abdominal wall, but the common cause is the bursting of a small abscess such as may form in the tubes of the uterus in **salpingitis** or in the appendix in **appendicitis.** Again, an intestinal **ulcer may perforate** and liberate fæces, which infect the peritoneal cavity; this **can** occur in typhoid.

The patient feels sudden, severe and continuous pain in the affected part of the abdomen. Here the muscles become rigid and very tender. Fever is present, but is seldom high, being 100° or 101° F. The pulse is always very rapid in comparison with the fever, being 120, 130 or 140. The tongue becomes very dirty. The bowels are severely constipated. The patient lies flat on his back with a sad and anxious face. The three important points are the sudden onset of severe pain, the rigid and tender muscles, and the fever. An operation is required to drain away the pus from the peritoneal cavity.

Intestinal Obstruction.—Intestinal obstruction signifies that the intestines are completely closed by a **mechanical obstruction** such as a knot. No fæces at all can pass, and purgatives and enemata produce no effect. One of the commonest causes is that of an obstructed hernia (p. 86).

The main sign of obstruction is that the bowels are quite unable to pass any stool. For this reason it is important to be able to distinguish between constipation and obstruction. If in doubt give an enema, but do not give purgatives. If a good result occurs, it is only constipation; if nothing is passed, it is obstruction.

In obstruction the patient always feels very severe and continuous pain in the abdomen. It will continue until he dies or until the surgeon operates. If the obstruction is in the small intestine (**high obstruction**), the patient **vomits** almost every hour large amounts of fluid. In the end the vomit is a dark brown colour and smells like fæces, and is called **fæcal vomiting.** Then death is very near. The abdominal muscles do not become rigid or tender, and the abdomen does not swell. If the large intestine is obstructed (**low obstruction**), the abdomen swells to an enormous size and feels **distended** like a blown-up bicycle tyre. The muscles are not really rigid, as in peritoneal infection; they are distended and firm like a tyre. Vomiting does not occur until late in this form of obstruction.

Hernia.

Definition and Cause.—The intestines hang in the peritoneal cavity, which is covered by a wall of muscles. If a hole occurs in the muscles, the intestines pass through the hole and slowly enlarge it, thus forming a hernia.

There are two common positions in which hernia may occur. One is in the **inguinal** region, where the spermatic cord from the testis enters the abdomen (Fig. 13). The testis travels from the abdomen to the scrotum during the first months of fœtal life, and the opening thus formed in the abdominal wall sometimes never closes. Sooner or later the intestines may find this opening and push through it to enter the scrotum. The other common situation for hernia is at the umbilicus. This opening should close soon after birth, but an umbilical hernia may form in babies. **Umbilical** hernia is usually not treated because it slowly cures itself as the child grows up, and the intestines inside it practically never become obstructed, so it will not be mentioned any further.

Signs.—A soft swelling, which feels like intestines, is felt in the scrotum. The swelling can be felt coming down from the opening in the inguinal region; in this it is different from all other scrotal swellings, which originate in the scrotum and do not descend from above. The swelling increases in size when the patient coughs.

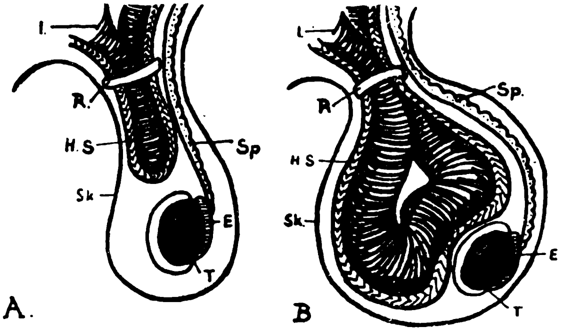


FIG. 13.—DIAGRAM OF AN INGUINAL HERNIA.

A, Ordinary hernia; B, strangulated hernia; R, ring; H.S., hernial sac; Sk, skin; T, testis; E, epididymis; Sp, spermatic cord; I, inguinal canal. (A.)

If the patient lies down, the swelling can usually be gently squeezed back into the abdomen. This, again, is different from all other scrotal swellings. If the hernia is large and has been present for several months, it may not be possible to push the intestines back into the abdomen. They have stuck to the inner wall of the scrotum and cannot move. The intestines, however, remain soft and practically no pain is felt; in other words, there are no signs of obstruction.

Strangulated Hernia.—Obstruction is the one complication that is always feared. The **ring** through which the intestines descend compresses and strangulates them. This causes a special variety of intestinal obstruction. Death occurs in two or three days unless an operation is performed at once.

The signs of strangulation and obstruction are a sudden and terrible **pain** in the scrotal swelling. Shock is present. The **swelling becomes larger and harder.** It cannot be returned into the abdomen, and it is dangerous to attempt to do so. The other symptoms and signs of obstruction occur (p. 83).

Treatment.—Only an operation can close the hole and prevent the intestines from protruding. When strangulation occurs there must be no delay; operation is imperative, and the case has become a surgical emergency.

Hydrocele.

Definition and Cause.—When fluid collects around the testis the disease is called a hydrocele. It is present in a bag called a sac.

Signs.—A round painless swelling occurs which feels like fluid. This occurs around the testicle, which is concealed by the fluid. It does not extend upwards into the inguinal region as occurs in a hernia, and it cannot be pushed into the abdomen.

Treatment.—An operation is required to remove the wall of the sac which contains the fluid. Tapping offers temporary relief, but can never cure.

Swellings of the Testis and Epididymis.

The commonest swelling is that of the **epididymis,** which occurs as a complication of gonorrhœa (p. 183).

Other diseases such as **syphilis, tuberculosis** and **tumours** can cause a chronic swelling, which should be treated by a surgeon. A **hydrocele** and an inguinal **hernia** both cause a scrotal swelling; they have been already described. **Extravasation** of urine (p. 88) can cause swelling of the skin of the scrotum and all the signs of acute inflammation.

Prolapse of the Rectum.

Definition and Cause.—Diarrhœa and dysentery, or even constipation, may cause the inside of the rectum to push out beyond the ring of muscle which forms the anus. This is called prolapse, and is common in children.

Signs.—A large red swelling is seen at the anus. It looks like the swollen round wall of a piece of bowel, having a hole at its centre.

Treatment.—The bowel is squeezed through the anus by any clean piece of cloth on which a small amount of any fat or ointment has been spread.

Stricture of the Urethra.

Definition and Cause.—Gonorrhœa is apt to remain concealed in the deeper parts of the urethra for many months or years. It causes much hard fibrous tissue to appear around the wall of the urethra. This fibrous tissue slowly contracts, so that many years later the urethra may close, and it is difficult to pass urine. It occurs only in males.

Symptoms.—The patient notices that it is difficult to pass urine. The patient cannot micturate quickly or forcibly, so that the stream of urine becomes weak and may dribble slowly from the penis.

Signs.—The signs of the disease can be found only by a surgeon, who examines by means of metal instruments called **sounds,** which are passed up the urethra. A large sound will not pass through the stricture.

Later on, if the stricture has been allowed to become worse, complete **obstruction** of the urethra occurs. Quite suddenly the patient finds that he is unable to pass any urine at all, and soon he becomes very uncomfortable from a full bladder. Unless the urine can be removed quickly one of two things may occur. First the force of the urine in the bladder manages to open the stricture. As a result a few drops of urine keep dribbling from the penis, but the bladder never empties completely (**retention and overflow**). The second result which may occur is that the urethra ruptures above the stricture and urine escapes under the skin of the scrotum (**extravasation**).

Sometimes small abscesses form around the urethra and near the stricture. These burst and form holes (**fistulæ**) in the perineum. Urine can escape through these fistulæ.

Treatment.—In the early stages of the disease the surgeon **dilates** the fibrous ring by passing first small and then larger sounds down the urethra.

If acute retention is present, a dresser may attempt the passage of a rubber catheter, but this can practically never succeed in passing a stricture. A surgeon may then try a **metal catheter.** If this cannot be passed, he will drain the bladder by an operation performed in the lower part of the abdomen (**suprapubic puncture**).

Various operations may then be attempted to open or remove the stricture. When the stricture has been dealt with, the patient should attend hospital every few weeks so that sounds can be passed to keep the stricture open.

Retention.

Definition.—When the bladder cannot empty but retains its urine, retention is said to be present.

Cause.—There are many causes of retention, but the commonest are stricture, gonorrhœa, operations, child-birth and disease of the central nervous system.

Stricture (Fig. 14, II.) has been explained already. **Gonorrhœa** produces a swelling of the wall of the urethra, which may cause retention. **Operations,** especially those which are performed on parts near the bladder, may interfere with micturition for a few days. During child-birth the head of the fœtus may press on and close the urethra of the mother. In diseases of the **nerves** of the spinal column, especially injuries to the spine, the nerves responsible for the bladder may not function well, thus causing retention.

Symptoms.—The severe pain of a full bladder is felt in all cases except those due to nervous disease, in which the patient may be unable to feel the pain.

Signs.—The full bladder can be felt as a large round swelling in the lower part of the abdomen. It may reach the umbilicus.

Treatment.—Retention, unless due to a stricture, can be overcome by passing a rubber catheter. It is most important to do this under sterile conditions. It should be repeated three or four times a day until the urine is passed normally.

Incontinence of Urine.

Definition.—When a patient cannot hold and pass his urine in the normal manner incontinence is present (Fig. 14, I.).

Cause.—The commonest cause is serious disease, such as pneumonia, which is interfering with the normal nervous reflexes of the bladder. Almost all dying persons are **incontinent.**

Disease of the urethra and bladder which can cause retention can also cause incontinence. The full bladder slowly dribbles urine from the penis, but never empties itself in the normal manner. This is more correctly spoken of as **retention and overflow** (Fig. 14, II.).

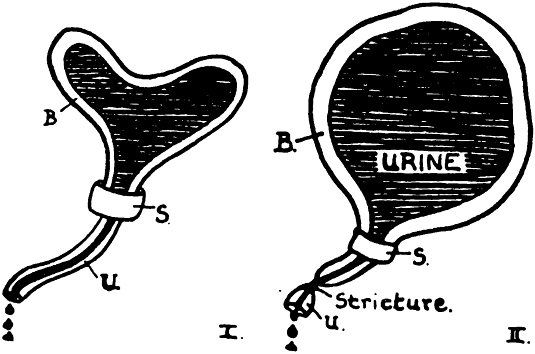


FIG. 14.—INCONTINENCE.
I., True incontinence; II., retention and overflow; B, bladder; S, sphincter; U, urethra. (A.)

Treatment.—This depends on the cause of the complaint.

Tumours.

Definition.—The cause of tumours is not known. They appear to be quite different from any other disease; they are not due to injury or bacteria or any of the known causes of disease. In tumours one tissue of the body is growing and increasing in size, perhaps very slowly, perhaps fairly quickly. They can be seen and understood when they appear on the skin, in which the commonest is the keloid tumour. Lumps of hard and thick black skin appear on an old scar, and they very slowly increase in size. Tumours can, however, occur in any part of the body; the skin has been mentioned because it is an example which can be easily understood. Naturally, if they occur inside the body, only a doctor can diagnose them.

Tumours can be divided into two big classes: The **simple** tumours continue to grow in the part in which they started. **Malignant** tumours, however, spread to other parts of the body, and always kill the patient in the end.

Signs.—The sign of a tumour is a **lump,** which is different from the swelling of either acute inflammation, such as an abscess, or that of chronic inflammation, such as the gumma of syphilis. They may be very difficult to distinguish from a gumma.

The lump may be soft, it may contain fluid—then it is called a **cyst**—or it may be very hard like a stone, and one which has slowly appeared during a period of a few months is almost certainly a tumour, and probably a malignant one.

If the tumour is near the surface of the body and is malignant, it will produce an ulcer which bleeds easily and looks different from ordinary ulcer. A **malignant ulcer** does not behave like a syphilitic or yaws ulcer, in that it will not heal when treatment is started for syphilis or yaws. In fact, any ulcer which will not heal but goes on increasing in size and has a hard edge is probably a malignant ulcer—that is, it is caused by a malignant tumour.

Malignant tumours and ulcers are found on the skin, on the tongue, in the breast. They also occur in the stomach, large bowel and uterus. In the stomach they cause severe indigestion and the vomiting of blood. In the large bowel they cause intestinal obstruction. In the uterus they cause a small daily discharge of blood.

Malignant tumours commonly spread to **lymphatic glands,** which become hard like stones. In the end many tumours form in different parts of the body. The patient becomes very thin, very weak and very anæmic, and cachectic. Great pain is felt, and death comes almost as a friend.

Treatment.—A surgical operation can usually completely cure a benign tumour. It is difficult to cure a patient with a malignant tumour because many small tumours are forming in other parts of the body.

Summary.

The Acute Abdomen.

Surgical emergencies in which medical treatment is useless and purgatives are dangerous.

Abdominal Injuries.

Penetrating injuries pierce the intestines and cause infection of the peritoneal cavity. Crush injuries rupture the spleen or liver and produce internal hæmorrhage.

Peritonitis.

Due to perforation or the bursting of an abdominal abscess, or penetrating wounds.

Signs—Severe abdominal pain, rigid muscles, fever.

Intestinal Obstruction.

Due to a mechanical stoppage of the intestines.

Not cured by enemata. Made worse by purgatives.

Signs—Complete constipation, even after an enema.

High obstruction—Severe and frequent vomiting.

Low obstruction—Severe and increasing abdominal distension.

Hernia.

Due to a weakness in the abdominal wall.

Common in the inguinal region and at the umbilicus.

Signs—A swelling, which increases in size on coughing and having a characteristic feel of contained intestines.

The inguinal swelling descends from above into the scrotum.

Treatment—Operation; this is an emergency in strangulation.

Hydrocele.

An accumulation of fluid in a sac around the testis.

Signs—A round, painless swelling, feeling like fluid.

Treatment—Operation or tapping.

Prolapse of Rectum.

Due to straining from diarrhœa, dysentery or constipation. In young children appears as bright red swelling at anus.

Treatment—Returned into the rectum by pressure.

Stricture of Urethra.

Due to chronic gonorrhœa causing fibrous tissue around the urethra.

Signs—Difficult micturition. Weak stream. Retention.

Treatment—Dilating with sounds or surgical operation.

Retention.

Due to stricture, gonorrhœa, operations, labour or nervous disease.

Symptoms—Unable to pass any urine.

Results—Overflow, with dribbling of the urine or extravasation.

Treatment—Catheter succeeds except in a stricture.

Incontinence.

Due to either retention and overflow or the true incontinence of serious illness, coma, head injuries.

Tumours.

Due to the continued and unlimited growth of one tissue.

Simple tumours remain where they commence.

Malignant tumours spread to other parts of the body and are fatal.

Signs—An external tumour forms an obvious swelling. An internal tumour is far more difficult to diagnose.

Treatment—An operation will cure a simple tumour, but is unlikely to cure a malignant one.

Questions.

1. What is the difference between intestinal obstruction and constipation? How do the signs and treatment differ?
2. What are the commonest causes of a swelling in the scrotum? How may they be distinguished?
3. Explain (*a*) retention, (*b*) prolapse, (*c*) incontinence, (*d*) ruptured spleen.
4. What change takes place in the signs present in an inguinal hernia when it strangulates?
5. In what respects do simple and malignant tumours (*a*) resemble one another, (*b*) differ? Is an operation likely to cure either of these two varieties of tumour?

PART III.—MEDICAL DISEASES

CHAPTER VII

GENERAL FEVERS

Malaria — Typhoid — Influenza — Measles — Chicken-pox — Smallpox — Mumps — Relapsing fever — Sleeping sickness—Leprosy.

General Fevers.

A PATIENT is said to be suffering from a general fever when the whole body is similarly affected and symptoms and signs do not point to one particular part. The infecting organism is usually in the blood stream. Severe inflammation of any part of the body, whether due to medical or surgical disease, is usually accompanied by fever. This occurs in cellulitis, an abscess, lobar pneumonia, bacillary dysentery and many other illnesses. These, however, produce local symptoms and can be distinguished from the general fevers, and will be discussed later.

When a patient has symptoms such as rigors, feverishness, headache, pain in the back and limbs, all of which suggest fever, it is necessary to take the temperature to find if fever is present. If fever is found to be present, it is necessary to find if the symptoms or signs point to acute inflammation affecting one part of the body. Thus cough, pain in the chest and a purulent sputum indicate that the fever is due to inflammation of the respiratory system. If the symptoms do not suggest acute inflammation in one part of the body, it is probable that one of the general fevers is present.

The amount of fever which is present will depend on the severity of the inflammatory process. It will be more severe in acute inflammation than in those chronic inflammations found in syphilis, tuberculosis and leprosy. In fact, in the latter diseases fever is often absent.

All the diseases in Chapters VII. and VIII. are communicable diseases—that is, they spread from one patient to another. They are also called infectious diseases.

Malaria.

Definition and Cause.—Malaria is due to a parasite which lives in the red blood cells. It is larger than a germ, and has a more highly developed structure.

Three forms of the malaria parasite cause disease in human beings: **Subtertian** (S.T.), **Benign tertian** (B.T.), and **Quartan** (Q.T.). In the tropics the only common variety is S.T. malaria; in certain places Q.T. malaria may be fairly common, but B.T. malaria is rare. These parasites can be distinguished only by means of a blood film which has been stained and examined under a microscope.

Since S.T. malaria is the commonest parasite, only this variety will now be described (Fig. 15). The parasite lives as a **ring** in the red blood cells of a person suffering from malaria. The ring develops in size until a large parasite called a **rosette** forms. This breaks up into numerous small parasites, thus destroying the surrounding red cell. Each of these parasites can enter a fresh red cell. This cycle occurs only in human beings, and is called **the asexual cycle,** for there are no male or female varieties of the parasite.

After the patient has suffered from malaria for a few days, other different varieties of the parasite occur. They are shaped like a **crescent**—that is, they resemble the shape of the new moon. There are two different varieties, male and female. They are called male and female because they behave in a sexual manner. These crescents cannot develop further in human blood; they can only reproduce in the mosquito in which the **sexual cycle** occurs. When a **mosquito** sucks the blood of a patient suffering from malaria, the crescents undergo certain changes in its stomach. The male crescent forms several small thread-like objects, one of which enters and **fertilizes** the female crescent. This develops into a small swelling, called **a cyst,** which lies in the wall of the stomach. The cyst develops many spores, which escape from the mosquito when it bites the human

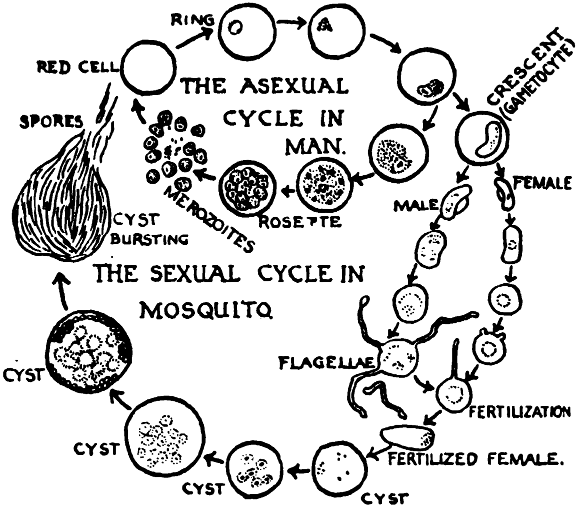


FIG. 15.—LIFE HISTORY OF THE SUBTERTIAN MALARIAL PARASITE. (A.)

skin. Each **spore** can enter a separate red cell and develop into a ring.

The Spread of Malaria.—Malaria spreads whenever there are a large number of anopheline mosquitoes. Only the **female anopheline mosquito,** however, can carry the disease. These become infected if there are many persons with crescents in the blood. Anything which will decrease the number of anopheline mosquitoes or the number of persons who carry crescents in the blood will decrease the amount of malaria.

Not every person who is bitten by a female anopheline develops malaria, for the mosquito may not have been infected with the parasites. Even if it has been infected with the parasites, not every person who is bitten develops malaria. Probably if he has never had the disease before the parasites will increase in number in the blood until the signs of malaria appear. If he has had several attacks of malaria before, then the body may be able to destroy the parasites before the signs of fever appear. Even if fever does appear, it will probably not be as severe as would occur in a person who has previously suffered little from the disease. This explains why **malaria can vary much** from patient to patient; some get severe attacks, some suffer very little. **Severe** malaria is common in African babies, in persons who travel to distant parts and in Europeans. African adults often have only **mild** attacks of malaria, or may never get fever, although they are frequently bitten by infected mosquitoes.

Symptoms — Severe Malaria.—The patient, who has previously felt quite well, suddenly starts to feel ill. Severe pains may occur in the limbs and back. Headache is usually very severe. He may feel giddy. Then he starts to feel cold and shivers. If this **rigor** (Fig. 16) is severe, the whole body shakes and the teeth chatter. He goes to bed and surrounds himself with warm clothing. In S.T. malaria the rigor may be very mild or even absent; only the feverish stage is noticed.

After feeling cold for a few hours, the **feverish stage** commences. He feels hot and flings away the bedclothes. The headache is usually more severe. He becomes very thirsty. At first the skin is burning hot and dry. Later sweating commences, the temperature falls, the patient feels better and may ask for food. Unfortunately, after a certain period of time the rigor and fever return. In this way rigor follows rigor, and in untreated cases the temperature chart is very instructive.

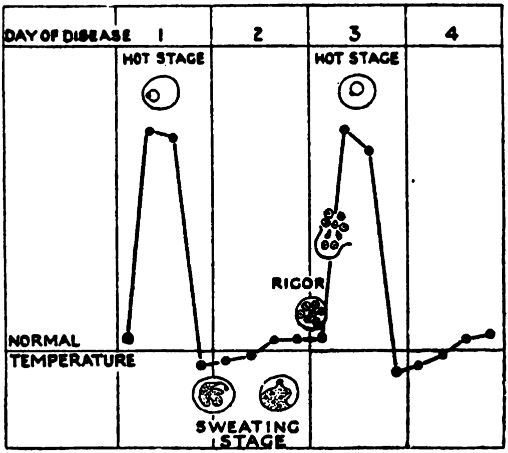


FIG. 16.—RELATION BETWEEN THE DEVELOPMENT OF THE MALARIAL PARASITE AND THE FEVER. (B.)

The three varieties of malaria produce the **different temperature charts** shown in Fig. 17. In benign

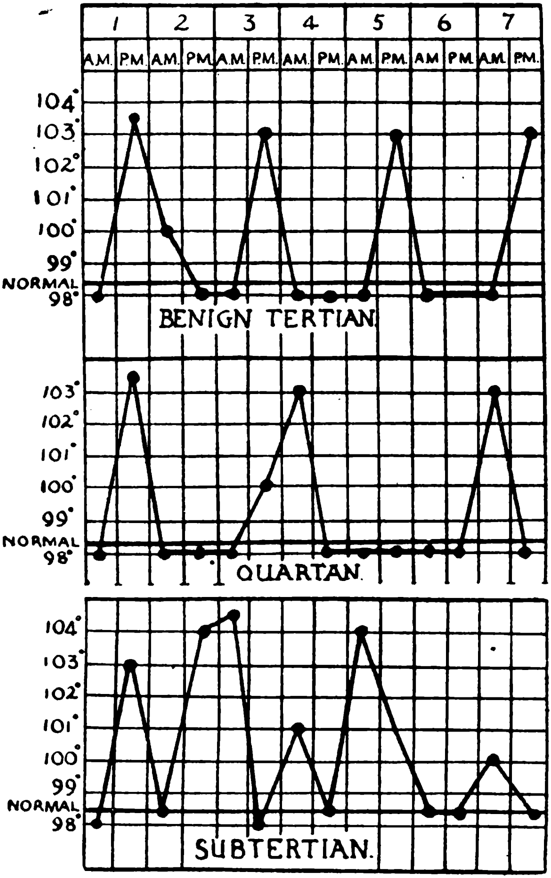


FIG. 17.—FEVER IN UNTREATED AND SEVERE CASES OF MALARIA. (A.)

tertian malaria fever occurs on the first and again on the third day, making an interval of two days. In quartan malaria fever is present on the first and again on the fourth day, making an interval of three days. In subtertian malaria the fever is irregular; it varies much from hour to hour and from day to day.

After the fever has been apparently completely cured and the patient has taken much quinine, a few parasites may remain in the body. Then several weeks or months later a **relapse** may occur, and all the symptoms of fever return.

Mild Malaria.—The patient may feel quite well, although parasites may be found in the blood film. Should this person travel to a cold part of the country, or not get his usual food, or receive an injury, the parasites increase in number and fever appears.

Other patients who suffer from mild malaria show **slight symptoms.** They may complain of headache, pain in the limbs, malaise and slight attacks of fever. The temperature may remain normal or rise to 99° or 100° F. The symptoms soon disappear after a few small doses of quinine.

Chronic Malaria.—Persons who live in parts of the country where there is much malaria usually get several severe attacks in infancy and childhood, but seldom suffer from severe fever in adult life. A few adults, especially those who are poorly nourished, may, however, show signs of chronic malaria. The babies and children will usually show signs of chronic malaria.

In chronic malaria the **spleen** is usually very large (Fig. 18). It is felt as a large hard swelling in the upper part of the abdomen. It lies on the left side and emerges from under the left ribs. It may cause pain from time to time. In addition the patient is usually **thin.** The blood is anæmic and appears pale in conjunctivæ, gums and tongue. Repeated attacks of malaria occur.

Signs.—The **usual signs of fever** are present, especially in the severe attacks. The lips are dry, and may show small blisters (labial herpes). The tongue is coated with fur.

The temperature chart varies according to whether the attack is severe or mild. In the former high temperatures of 104° or 105° F. occur. In the latter temperatures of about 100° F. are present. The **spleen** enlarges, but if it has been previously normal in size many days may pass before it appears as a swelling in the abdomen.

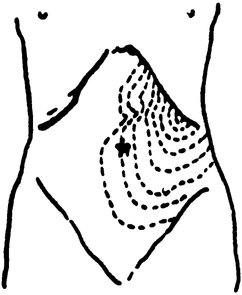


FIG. 18.—THE POSITIONS OCCUPIED BY THE SPLEEN AS IT ENLARGES. (A.)

Indeed, the fever may be cured by quinine before any splenic enlargement can be detected. After repeated attacks of malaria the spleen enlarges considerably, and may never return to its normal size. Enlargement is present even when there is no malaria in the body. An enlarged spleen does not prove that the patient is suffering from malaria at the time of examination. It does prove that the patient has suffered in the past from malaria. This point must be clearly grasped or many mistakes will be made. If the spleen is ever painful or tender, it is probable that active malaria is present.

Diagnosis.—Malaria is diagnosed clinically when the symptoms and signs all point to malaria and other causes of fever can be found. The common causes of fever which are confused with malaria are diseases of the respiratory tract, such as pneumonia, and severe surgical sepsis. The diagnosis is confirmed by finding the parasites in the blood film.

Complications.—Malaria is seldom fatal in African patients, but occasionally one of the following complications can occur. They are serious and may cause death.

1. **Cerebral Malaria.**—Adult patients become unconscious; they lie quietly in bed or may have signs which suggest meningitis—that is, fever is present, they are irritable, and the head is forcibly extended backwards. Children and babies who develop cerebral malaria often suffer from convulsions; they become unconscious, the face twitches and the eyes squint.

2. **Severe Bilious Vomiting.**—The patient vomits repeatedly a large amount of very bitter greenish-yellow vomit. Pain is present at the top of the abdomen over the liver (Fig. 2). Jaundice is present. If a quinine mixture is given it is vomited. Quinine injections are therefore required.

3. **Severe Diarrhœa or Dysentery.**—Loose frequent stools are passed. They are greenish-yellow in colour and often contain mucus.

4. **Collapse.**—The patient becomes extremely weak, the hands feel cold, the pulse becomes very frequent and feeble. Blood films reveal many S.T. rings.

5. **Anæmia.**—Severe anæmia may occur. The conjunctivæ are pale.

Treatment.—If fever is present the patient should be in bed. The diet should be light, especially if vomiting is present. Many Africans who have grown up in malarious districts get only mild attacks of fever from which they recover even if they get little or no quinine.

Quinine is an extremely effective drug in the treatment of malaria. Quinine destroys the rings, but it has no effect on the crescents. Quinine is an expensive drug; other drugs like totaquina contain quinine, but are not as expensive.

An ordinary case of malaria is cured in two or three days by giving 5 grains of quinine or totaquina three times a day. More severe cases may require 20 or 30 grains in a day. **In them the fever may last for four or five days; but if the fever lasts for more than five days in spite of adequate doses of quinine, it can be stated that the disease is certainly not a case of malaria.** The serious complications of S.T. malaria are treated by a daily intramuscular injection of quinine, from 6 to 12 grains, until the danger has passed; then a quinine mixture can be used. Mepacrine, formerly called atebrin, can be given as tablets of 0·1 gram thrice daily for three to five days like quinine.

Typhoid Fever.

Definition and Cause.—Typhoid fever is an infectious disease which is caused by swallowing typhoid bacteria in the food or drink. The bacteria invade certain parts of the small intestine, in which ulcers appear. The infection travels in the blood stream to other parts, such as the spleen. A severe toxæmia occurs, due to the absorption of toxins in the blood. Typhoid bacteria leave the body in the fæces and also in the urine. If these contaminate drinking water, an epidemic will occur among those who use this water.

Symptoms.—The disease seldom begins suddenly, as do malaria and lobar pneumonia. A few days, therefore, pass before the patient reports sick and goes to bed. He notices that he does not feel well and that he has a severe headache. Apart from this, most patients **complain of little.** Some have slight abdominal pain, perhaps mild diarrhœa is present; others complain of constipation. Sooner or later the patient notices that **fever** is present, but rigors are quite uncommon.

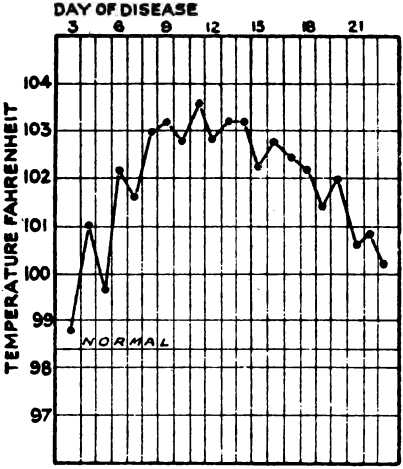


FIG. 19.—TEMPERATURE CHART OF TYPHOID FEVER.

Signs.—The most important sign of typhoid is the **characteristic temperature chart** (Fig. 19). The fever rises slowly in the first week; this is called a step-ladder rise. At the end of the first week the temperature is usually 103° to 104° F. During the second and possibly during the third week the temperature remains continuously high, showing little change from day to day. Sooner or later in favourable cases the temperature starts to fall, but this lysis is slow and takes about a week to reach normal. The fever therefore lasts from three to five weeks.

During the second or third week the toxæmia may be very severe. If this is severe, the patient is said to be in the **typhoid state.** He has high and continuous fever. He lies quietly and sleepily, flat on his back. He dozes by day and sleeps uneasily at night. The eyes are half closed. The patient notices nothing. He asks for nothing, not even for food or drink. He does not speak, but often the low, muttering, indistinct words of delirium are heard. His mouth is extremely dirty. The pulse is rapid. Patients with less toxæmia do not show these signs of the typhoid state.

In typhoid fever patients may pass a loose, **watery, yellow stool,** often referred to as a pea-soup stool. Others are constipated.

During lysis the general condition improves, the toxæmia decreases, the tongue becomes cleaner and the appetite returns.

Complications — 1. **Intestinal Hæmorrhage.** — The hæmorrhage occurs from the intestinal ulcers, but several hours may pass before the blood appears in the stool. The signs of a severe hæmorrhage appear (p. 59)—that is, the patient becomes cold and collapsed, the temperature falling to subnormal. At the same time the pulse becomes rapid and weak. Blood is passed in the stool, either as a dark black fluid (melæna) or the fæces may be definitely red and blood-stained. Until this occurs the diagnosis of hæmorrhage is uncertain. A hæmorrhage is treated by stopping all food, and an injection of morphia is ordered by the doctor.

2. **Intestinal Perforation.**—Perforation is due to a deep ulcer which has perforated into the peritoneal cavity. Infected fæces pass out of the intestines to enter the peritoneal cavity and cause generalized peritonitis. When perforation occurs the patient experiences very severe abdominal pain. The temperature may drop, but often shows little change. The pulse-rate increases as peritonitis develops. The abdominal muscles become hard and rigid. An immediate operation is required.

Treatment.—This is considered in detail in "Nursing," pp. 118-121. It consists essentially of two aspects. Firstly, steps are taken to **prevent the spread of the infection.** This consists in the disinfection of the stool and the urine, the clothing, bedding and utensils, and the washing of the attendants' hands. Secondly, since no drug will shorten the course of the disease, the treatment of the patient consists in administering **a nutritious but light diet,** in the **usual nursing care of fever** and in the treatment of symptoms as they arise. A typhoid diet should contain from 2,000 to 3,000 calories a day, and should consist largely of sugar, glucose, gruel, milk, cream and eggs. Those who are not too ill can safely be allowed almost any form of soft food. High fever is treated by **cold sponging.**

Influenza.

Definition and Cause.—Influenza is due to a **virus** —that is, a small and invisible micro-organism. It infects the nose, throat and the upper part of the respiratory tract. Other bacteria may follow the virus and produce bronchitis or pneumonia. The disease occurs mainly in **epidemics.**

Symptoms.—There is a sudden onset of **fever** and

pains in the head, back and limbs. Soon the symptoms of respiratory infection, sneezing and **coughing,** appear.

Signs.—Moderate fever is present, the temperature being often 100° to 102° F. The cough is dry in the early stages; later on muco-purulent sputum is expectorated. These signs last for only a few days unless the more serious complications occur.

Diagnosis.—Influenza is easily confused with **malaria,** but three points distinguish the two diseases. Firstly, cough occurs only in influenza; secondly, the blood slide is positive only in malaria; thirdly, influenza occurs in epidemics.

Treatment.—Fever is treated by rest in bed and a light diet. **Aspirin** relieves the headache and limb pains. A cough medicine may aid the cough.

Measles.

Definition and Cause.—Measles is an infectious disease which is probably due to a **virus.** In towns it occurs as **epidemics** in young children. In country districts epidemics are not common, so that many children grow to adult life without suffering from the disease, which they can then contract. The virus causes inflammation of the respiratory tract; later on other bacteria enter and cause bronchitis and pneumonia. It is spread by coughing and sneezing, which expels the virus in fine droplets. The virus is also responsible for the rash in the skin.

Symptoms and Signs.—The disease commences like a severe cold in the head. The child is **fretful,** the eyes are red and the nose discharges freely. A **cough** is heard. **Fever** is present, the temperature being about 102° to 103° F.

The **rash** appears on the fourth or fifth day, and before this the disease is seldom distinguished from a severe coryza. It appears as very fine pimples, appearing first on the face and then spreading all over the body.

Fever usually lasts from four to seven days. The patient is seldom very ill unless **broncho-pneumonia** occurs. This is only seen in poorly nourished children. Should this occur, the fever remains high and the pulse and respirations increase much in frequency.

Treatment.—If possible, the case should be isolated, but since the disease is often very mild in tropical Africa, few steps are taken to carry this out.

Fever is treated in the usual manner. Rest in bed, fresh air and protection against cold do more than anything else to prevent broncho-pneumonia. A cough medicine is usually given, but in this disease medicines do little good.

Chicken-pox.

Definition and Cause.—This infectious disease attacks both children and young adults. It is probably caused by a **virus,** which is present in the rash and in the crusts which subsequently form. The individual case is infectious, and in addition clothing and bedding can spread the disease.

Symptoms and Signs.—The disease commences with severe **fever.** Usually within a few hours the rash appears. It starts on the trunk, where at all stages of the disease the **rash** is more severe than elsewhere (Fig. 20). Several spots may appear on the face and a certain number are found on the limbs, the more distant parts of which escape lightly. The palms and soles are never attacked.

The rash commences as large dark pimples, but within a few hours they turn to small blisters. At first these contain clear watery fluid, later they

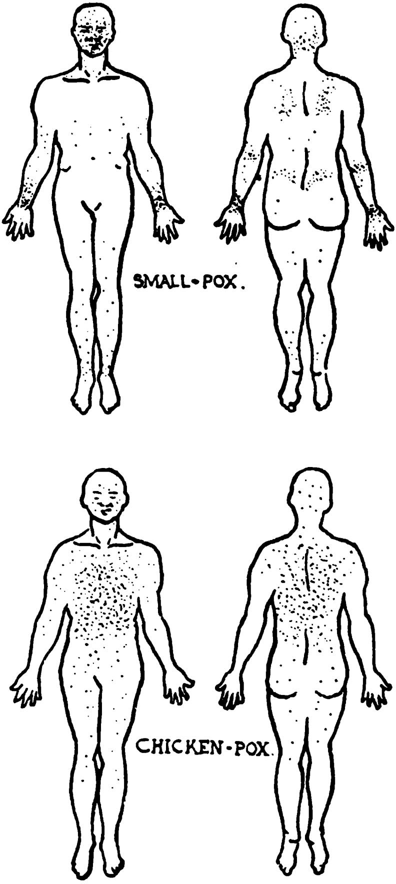


FIG. 20.—DISTRIBUTION OF THE RASH IN SMALLPOX AND CHICKEN-POX. (A.)

become white and opaque, but they never contain as much pus as the rash of smallpox.

The rash appears in **crops**—that is, on the second day, when the first pimples occur. Two or three crops occur, so that late in the disease the individual spots vary much in appearance. Some are old scabbed blisters; others are tense clear blisters; others are pimples. This, again, is never seen in smallpox. Chicken-pox never kills; smallpox is often fatal.

Treatment.—The case should, if possible, be isolated. Rest in **bed** and **light diet** is advisable during the period of fever. The case remains infectious until all the scabs have separated.

The rash causes much irritation of the skin. This can be relieved by dusting powder, or by calamine and carbolic lotions. No medicine, apart from aspirin during the fever, is of any use in this disease.

Smallpox.

Definition and Cause.—Smallpox is an **extremely infectious** disease which is caused by a **virus.** This is present in the rash and the discharges, and so infects everything which is in contact with the patient. It is blown far and wide by the wind, so that anyone who comes within a few hundred yards of a case of smallpox may get the disease. No other disease spreads so easily. When an **epidemic** commences, almost everyone who has not previously had the disease or has not been vaccinated soon contracts the disease.

Symptoms and Signs.—The illness starts with a severe **rigor** and **fever.** Headache is severe, and the patient complains of much **pain in the back.** Until the **rash appears on the third day** it is very difficult to diagnose the disease.

The **forehead** and **wrists** first show the rash, which spreads rapidly on the face and arms. The trunk is also attacked, but not as severely as the face and arms (Fig. 20). It appears on the palms and soles. In all these points the distribution of the rash differs from that of chicken-pox.

All the rash appears on the third day; it does not appear in crops as does that of chicken-pox. On the first day of the rash (third day of the fever) it appears as hard deep pimples. On the third day of the rash (fifth day of the fever) these have developed into fairly large blisters, which contain a clear fluid. On the fifth day of the rash (seventh day of the fever) pus has developed in the blisters. About this time the patient is very ill, and he may die in the next few days.

In cases which recover the rash slowly dries up to form scabs. These slowly separate and leave deep scars. Until all the scabs have separated the patient is infectious.

Treatment.—The case must be **strictly isolated** and cannot be treated in an ordinary hospital. Special huts should be built at least half a mile from any other building.

Inform the Medical Officer of Health immediately any suspicious cases occur. He will come at once and arrange for the isolation of the case, the **quarantine** of persons who have come into contact with the case, and the vaccination of other persons in the district.

Vaccination prevents smallpox. It may be regarded as causing a mild form of smallpox on the vaccinated arm which causes the person to become immune to the disease ("Anatomy and Physiology," p. 173). If anyone is vaccinated within seven days of seeing a case of smallpox he is protected. After seven days it is too late; then the smallpox will probably develop before the vaccination appears on the arm.

The treatment of the actual case of smallpox follows the usual lines for the treatment of fever. Good nursing is essential and can accomplish much. Pain is relieved by opium or morphia. Cold carbolic lotion relieves the painful rash.

Mumps.

Definition.—This mild infectious fever is probably caused by a virus, which attacks the salivary glands which lie below and in front of the ears.

Symptoms and Signs.—Slight fever is present for a day or two. Soon the swollen glands appear on each side of the face in front of and below the ears.

Treatment.—Aspirin gives some relief, and hot fomentations ease the pain of the swollen glands.

Relapsing Fever.

Definition and Cause.—Relapsing fever is caused by a special spirochæte, the *Spirochæta recurrentis* (Fig. 21). These organisms are long and shaped like a spiral spring. They are found in the blood stream of a patient suffering from the disease, and can be demonstrated in the blood slide, especially in the thick drop preparation.

In most parts of Central Africa relapsing fever is spread by the **tick,** *Ornithodorus moubata* (Fig. 21, B; and also "Anatomy and Physiology," Fig. 69, p. 191). In other parts of the world the **louse** (Fig. 21, C) may spread the disease. These insects feed on the blood of a patient and take in the spirochætes. Subsequently they bite other persons, who then contract relapsing fever.

Ticks live in the dark cracks of native houses. They emerge at night-time to bite persons sleeping in the hut. The inhabitants of the district which harbours the ticks get severe attacks of relapsing fever in childhood, but seldom suffer from the disease in adult life. Strangers, however, who are travelling through the district often contract the disease and suffer severely from it.

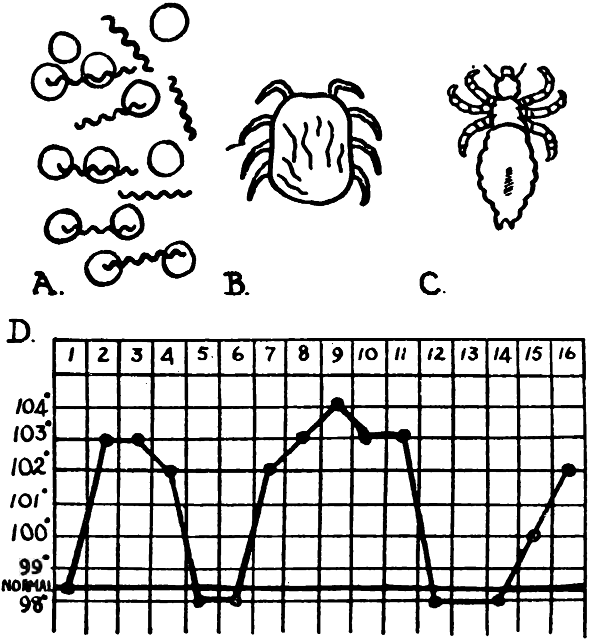


FIG. 21.—RELAPSING FEVER.

A, Red blood cells and *Spirochæta recurrentis;* B, tick (*Ornithodorus moubata*) (× 2); C, louse (× 5); D, temperature chart. (A.)

Symptoms and Signs.—The patient experiences a **rigor** and **fever** commences. The temperature rises to 103° or 104° F., and remains high for a few days (Fig. 21, D). It is not reduced by quinine, and it is not intermittent. These points serve to distinguish relapsing fever from malaria. After remaining high for a few days the temperature falls, and remains normal for a few days. Sooner or later a **relapse** occurs and a second bout of fever takes place. In this way a variable number of relapses occur.

During each attack of fever severe pain is experienced in the abdomen, head and limbs. Bile is usually vomited. The spleen and liver enlarge and are tender.

Treatment.—N.A.B. is a specific remedy, and 0·6 gramme may be given to an adult. It should be given **during the beginning of a relapse,** preferably when the temperature is rising. If given towards the end of a relapse, it may produce a fatal collapse. In addition the usual treatment of fever is given.

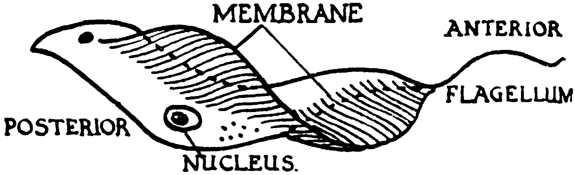
Sleeping Sickness.

Definition and Cause.—Sleeping sickness is caused by parasites called **trypanosomes** (Fig. 22). They are found in the blood at the commencement of the illness; later they settle in the brain and spinal cord.

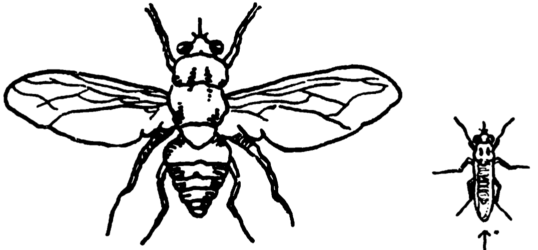
The disease is spread by **tsetse flies** (Glossina) (Fig. 22), which suck the blood of infected persons and can then transmit the disease. (The spread of the disease is discussed further in " Anatomy and Physiology," p. 181.)

There are two main varieties of the parasite, each of which is carried by a different variety of tsetse fly. The **gambiense variety** of the trypanosome is carried by the **palpalis fly.** This fly reproduces in the sandy borders of lakes, rivers and water-holes. This variety of the disease is therefore found among the inhabitants who live near the lake-shore or near infected river banks. The **rhodesiense variety** of the trypanosome is carried by the **morsitans fly.** This fly can reproduce in the open bush far away from water. It causes a more severe variety of the disease.

Symptoms and Signs—First Stage.—Long periods of irregular **fever** occur, lasting for weeks or months at a time. Long periods may intervene during which the temperature is normal. The lymphatic **glands** enlarge, especially those at the back of the neck. Trypanosomes can be found in the fluid obtained by gland puncture. This is the most accurate method of diagnosis at this stage, for although they may be found in a thick-drop film, this is frequently negative.



TRYPANOSOMA. (x 3,000)



GLOSSINA. (TSETSE FLY.)

NATURAL SIZE.
AT REST.

FIG. 22.—SLEEPING SICKNESS. (A.)

Second Stage.—As soon as the **nervous tissues** are attacked, the second stage is reached. In the gambiense variety from one to two years elapse before this occurs, but in the more rapid rhodesiense variety a few months may suffice. Patients become slow in their mental processes, and the expression of the face is sad. Tremor develops in the hands, feet and tongue. Stupor increases until the time comes when the patient sleeps most of the time. Much wasting occurs. During the second stage the trypanosomes may be found in the cerebro-spinal fluid obtained by lumbar puncture.

Treatment.—If treatment is to succeed, it must be commenced in the first stage. Once the nervous tissues are attacked, treatment may prolong life, but is unlikely to produce a cure.

Antrypol is given during the first stage as a course of intravenous injections, the dose being 1·0 gramme dissolved in 10 c.c. of distilled water. **Tryparsamide** is given if the second stage is reached. From 1·0 to 3·0 grammes dissolved in 10 c.c. of distilled water is given intravenously at each injection, and a course of these is given. Both drugs are dangerous, and are given under the supervision of a medical officer.

Leprosy.

Definition and Cause.—Leprosy is an **infectious** disease which affects the skin and the nerves of the body. It is due to the **leprosy bacillus,** which is present in the rashes, ulcers, and discharges.

Symptoms.—Most lepers complain of few symptoms, but point to the signs of disease on their bodies.

During the early stages patients may notice attacks of fever. The leprosy which is attacking the nerves may cause symptoms of pain and peculiar sensations like pins or insects moving on the limbs.

Signs.—The first signs of leprosy are large **patches of pale skin.** The skin is not white: it is only pale in colour. These patches are common on the face and arms, but may occur anywhere.

One fact distinguishes these patches from those of all other diseases of the skin. The patches **cannot feel pain,** such as the point of a pin, as well as normal skin. This proves that the nerves are being destroyed. A pale patch which cannot feel pain proves the presence of leprosy.

Later thick masses of skin form, and they are common on the ears, eyebrows, cheeks, and nose. They change the appearance of the face. Later, as the nerves of the arms and legs die, ulcers appear on the hands and feet and the toes and fingers drop off.

Treatment.—It is impossible to treat leprosy in a dispensary. The correct treatment is found only in **special hospitals** set apart for lepers. In these hospitals the patients are segregated; they are kept clean, they are fed well and are made happy, and these factors are probably the most important part of the treatment.

Special injections are used in the treatment of leprosy. They may cure a few early cases if continued for many months. The disease is infectious, and can be prevented by living in healthy, clean conditions away from those affected.

Summary.

General Fevers.

1. Due to infection of blood stream by parasites, bacteria, or viruses.
2. Local symptoms are not prominent.
3. The majority are infectious diseases.

Malaria.

Three varieties—subtertian, quartan, and benign tertian.

Development of S.T. Parasite (Fig. 15).

1. Asexual cycle in man. In red cells there are rings —> rosette —> breaks up —> new parasites —> fresh red cells.
2. Sexual cycle in mosquito. In man there are crescents —> female anopheline —> fertilization, cyst in stomach wall —> spores —> blood of person bitten —> rings in red cells.

Spread of Malaria.

Depends on—

1. Number of anopheline mosquitoes.
2. Number of crescent carriers.

Symptoms.

1. Severe malaria—Rigors, fever, headache, generalized pains, sometimes vomiting.
2. Mild malaria—Very slight symptoms, headache and low fever.
3. Chronic malaria — Enlargement of spleen, anæmia, loss of weight.

Signs.

1. Characteristic temperature chart (Fig. 17).
2. Enlargement of spleen, especially after several attacks.
3. Blood slide should always show parasites.

Complications of S.T. Malaria.

1. Cerebral malaria—Stupor, coma, fever.
2. Severe bilious vomiting—Repeated vomiting of bile, jaundice, fever.
3. Diarrhœa or dysentery—Green stools, blood, and mucus in the stools.
4. Collapse due to heavy infections—Pulse rapid and weak.

Treatment.

1. Quinine 10 to 15 grains a day, or mepacrine 1 tablet thrice daily for four to five days.

2. Totaquina—10 to 20 grains daily, as effective as quinine, cheaper.
3. Quinine injections—5 to 10 grains in the serious complications.

Typhoid Fever.

Due to typhoid bacteria swallowed in food or drink.

Symptoms.

1. Slow onset of malaise, headache, and fever.
2. Some have mild abdominal symptoms, pain, diarrhœa, or constipation.

Signs.

1. Characteristic temperature chart—first week rising, second and third high and continuous, fourth gradual lysis (Fig. 19).
2. Severe toxæmia—the typhoid state—in third week.
3. Some cases have loose, watery, pea-soup stools.

Complications.

1. Intestinal hæmorrhage—Sudden fall of temperature, rise of pulse-rate, collapse, and later a melæna stool. Treated by stopping all feeding and morphia injection.
2. Intestinal perforation causing generalized peritonitis—Sudden severe abdominal pain, tender and rigid abdominal muscles. Treated by an immediate operation.

Treatment.

1. Measures designed to prevent its spread—Disinfection of stools, urine, bedding, utensils, washing of dresser's hands.
2. Measures to support patient's strength—Nursing, fluid diet.

Influenza.

An infectious respiratory disease, due to a virus, occurring in epidemics.

Symptoms—Febrile symptoms, coughing, sneezing, coryza.

Signs—Fever, coryza, cough.

Treatment—Rest, aspirin, cough medicine.

Measles.

An infectious disease due to a virus. Epidemics in children and young adults.

Symptoms and Signs—Fever, respiratory catarrh, rash on fourth or fifth day.

Broncho-pneumonia a complication.

Treatment—Isolation, rest in bed.

Chicken-pox.

An infectious disease due to a virus. Epidemics in children and young adults.

Symptoms and Signs—Severe fever on first day, rash within twenty-four hours.

Rash—Profuse on trunk and face, scanty on arms and legs, none on soles.

Develops rapidly into blisters; occurs in crops.

Treatment—Isolation; carbolic lotion for rash.

Smallpox.

A very infectious disease due to a virus. Occurs in epidemics. Attacks everyone who has not been vaccinated or who has not had the disease previously.

Symptoms and Signs—Severe rigor, fever, backache.

Rash appears on third day. Severe on face and wrists, less on trunk; invades palms and soles. All occur at the same time, and slowly develop to blisters and pustules.

Prevention—Vaccination, if performed up to seven days after seeing a case, protects against the disease.

Treatment—Strict isolation; vaccinate all contacts. Treat the case by nursing, fluid diet, opium, and morphia.

Mumps.

A mild infectious disease affecting certain salivary glands. Causes mild fever and swollen salivary glands near the ear. Treated by hot fomentations.

Relapsing Fever.

A severe febrile illness caused by spirochætes spread by a certain tick.

Symptoms and Signs—Resemble a severe attack of malaria, but fever lasts a few days, is then normal for a few days, then relapses.

Treatment—N.A.B. given when the temperature is rising.

Sleeping Sickness.

A chronic febrile and infectious disease caused by trypanosomes, spread by tsetse flies.

Gambiense variety spread by palpalis fly.

Rhodesiense variety spread by morsitans fly.

First Stage—Chronic fever and enlargement of lymphatic glands of neck. Diagnosed by gland puncture.

Second Stage—Mental apathy, tremors, wasting. Diagnosis by lumbar puncture.

Treatment—Antrypol in first stage: effective in early cases. Tryparsamide in second stage: not so effective.

Leprosy.

A chronic infectious disease caused by certain bacteria.

Causes—

(1) Pale patches of skin where sensation is lost.
(2) Thick nodules of the skin on face, arms, etc.
(3) Deformed hands or feet.
(4) Destruction of nerves of the limbs..

Treatment in special institutions. Increase general health. Injections.

Questions.

1. Describe the development of the malarial parasite and show from this how the disease spreads.
2. Draw temperature charts for (*a*) typhoid fever, (*b*) typhoid fever complicated by intestinal hæmorrhage, (*c*) B.T. malaria, (*d*) S.T. malaria, (*e*) relapsing fever.
3. Describe in detail the treatment of a case of typhoid fever.
4. How may the rashes of chicken-pox and smallpox be distinguished ?
5. Describe how diseases are spread by (*a*) ticks, (*b*) mosquitoes, (*c*) tsetse flies, (*d*) infected drinking water.

CHAPTER VIII

FEVER DUE TO LOCAL INFLAMMATORY DISEASE

Coryza — Pneumonia — Cough — Whooping-cough — Pulmonary tuberculosis — Plague — Cerebro-spinal fever — Tonsillitis.

In the preceding chapter the general fevers were discussed. They are due to an invasion of the blood by bacteria, parasites or a virus. They produce general symptoms and signs.

Severe local inflammation of any part of the body may also cause fever, but then the chief symptoms and signs are those of the local disease. Such diseases may be surgical or medical, and inflammation is present in both.

Surgical inflammatory diseases which cause fever were discussed in Chapter V.; in this chapter medical inflammatory diseases will be dealt with. Practically all of them are infectious diseases.

Coryza.

Definition and Cause.—Coryza is an infectious disease affecting the nose and throat. It is probably caused by a virus.

Symptoms and Signs.—Moderate fever is present for a day or two; on the other hand, none may occur. Sneezing and coughing soon appear. Bronchitis may develop and is common in babies. A nasal discharge and nasal irritation are prominent symptoms. Headache may be severe.

Treatment.—Aspirin or quinine may be given internally. Local treatment to the nose is best carried out by instilling drops of liquid paraffin which contains a small amount of menthol. Several drops are placed in each nostril and allowed to run back into the throat.

Pneumonia.

Definition and Cause.—There are two varieties of pneumonia—**lobar pneumonia,** which starts in a lobe of the lungs; and **broncho-pneumonia,** which starts as bronchitis and slowly spreads into the lungs. They are both caused by bacteria which produce inflammation of the lungs, pneumococci and streptococci being the commonest.

Symptoms.—**Lobar pneumonia** starts suddenly. The patient often has a **rigor,** perhaps he vomits, and he feels very ill. Within a few hours he feels a very severe **pain in the side of his chest** (Fig. 1), which cuts like a knife every time he breathes or coughs.

It is due to the inflammation involving the pleura. He soon starts to **cough,** and produces sticky **sputum** which may be brown (rusty) or red (bloody) in colour.

Broncho-pneumonia starts more slowly. The patient has a cough due to bronchitis. He slowly becomes worse, and all the signs become more serious. The fever rises, the pulse and the respirations become more rapid. He feels little pain in the chest. The sputum resembles that of bronchitis, being white and thick, and is called muco-purulent.

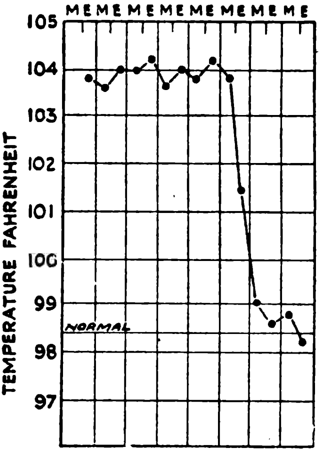


FIG. 23.—TEMPERATURE CHART OF LOBAR PNEUMONIA. (B)

Signs. — The patient appears to be **very ill.** The lips are dry, and often small blisters, called labial herpes, appear on them. The tongue is thickly furred. The **temperature** is high, being 102°, 103° or 104° F. The **pulse** is rapid, being 110, 120, 130, or 140. The **respirations** are shallow and rapid, being 30, 40, 50 or 60 a minute. This fast but shallow breathing should always suggest pneumonia. Grunting noises are made if pain is present. A description of the sputum has been given already.

These signs are present in both varieties of pneumonia.

Lobar pneumonia has continuous high fever for about a week, and then it is terminated by **crisis or lysis** (Fig. 23). This disease is the commonest cause of death in adult Africans.

Broncho-pneumonia is more common in the very young and the very old, in whom any cough must be treated seriously. It starts more slowly, the temperature **chart is more irregular,** it often lasts two or three weeks, and it always ends by lysis.

Treatment.—Sulphathiazole or sulphapyridine are specific in the treatment of pneumonia. A loading dose of 4 to 8 tablets (2 to 4 grams) is given to an adult and then maintenance doses of 2 tablets (1 gram) are given every 4 hours of the day and night. Most cases respond within two to three days, and if any patient does not improve within seven days it is unwise to continue the drug.

The patient must be fed and helped with the bedpan. **Sleep** is very necessary, and may be helped by sleeping draughts. Opium or morphia may even be given during the first few days of lobar pneumonia, for then **pain** is very severe. These drugs are never given late in lobar pneumonia or broncho-pneumonia.

In lobar pneumonia the **cough** is painful: it does little good, and it produces very little sputum. A cough linctus or a sedative cough mixture is beneficial and produces muco-purulent sputum. It should be encouraged with ordinary stimulating cough medicines.

Heart failure is indicated by a very rapid and thin pulse. It should be prevented by resting the patient. When it has already occurred, practically nothing can be done. Injections of heart stimulants such as adrenalin or strychnine are usually tried, but have almost no effect.

Every patient taking any sulphonamide should drink 6 pints of fluid daily. The **diet** is according to the patient's appetite.

Cough.

Every disease which attacks any part of the respiratory tract causes cough. Coughing discharges the mucus and pus produced by the disease. In the nose, **coryza** is a common cause of cough. Irritation of the throat (**pharyngitis**) produces a loud cough, but only thin, watery, mucoid sputum is produced, and the patient is never seriously ill and has no fever. Other cases of pharyngitis produce no sputum, so that the cough is said to be dry. Inflammation of the bronchi (**bronchitis**) produces a cough, some fever, and thick white or yellow muco-purulent sputum. If this disease advances into the lung, **broncho-pneumonia** occurs. **Lobar pneumonia** starts in the lung, and has been already described. **Pulmonary tuberculosis** causes a chronic cough which lasts for many months. **Measles** and **influenza** produce catarrh of the upper part of the respiratory tract, with cough as a prominent symptom. **Whooping-cough** is a special variety of infectious bronchitis with a characteristic cough.

Varieties.—Unless the patient can be examined with a stethoscope, it is impossible to say exactly what is causing the cough, but the medical orderly can distinguish the following varieties:

1. **Coryza,** obvious by questioning the patient and looking at the discharge from the nose. Influenza may be regarded as an infectious and severe coryza, and so causes a cough.

2. **Measles** may be regarded as a special infectious coryza and bronchitis. It is diagnosed by means of the rash.

3. **Pneumonia.**—Any acute illness in which the patient is very ill and which produces a cough and fever should be called pneumonia. The pleural pain and rusty sputum are characteristic of lobar pneumonia.

4. **Tuberculosis.**—Any chronic illness in which the patient coughs, becomes thin and has slight fever should be regarded as tuberculosis. The diagnosis is confirmed by finding T.B. in the sputum.

5. **Whooping-cough** will be discussed later (p. 128).

6. Cough which produces muco-purulent sputum. This is probably **bronchitis.** Pain is present in the upper part of the front of the chest. No fever is present if the disease is mild. If the disease is severe, fever is present, and this often occurs in infants and the aged.

Fever should not be high, and should cease within a week. If it continues and becomes high, bronchopneumonia should be suspected. Coughing which produces sputum can be recorded in the register as "cough" or "bronchitis." It is treated by cough medicines which aid the production and expectoration of sputum.

7. An unproductive cough or one which produces only a thin sputum is probably **pharyngitis.** No pain is present in the chest, and fever is not present. The back of the throat appears abnormally red. This mild disease is easily caused by the smoke of a fire, pipe or cigarette; it can be produced by dust. Alcohol can cause it. As none of these things can be easily controlled, it is difficult to cure this cough, but the patient can be informed that it is not a serious disease. A medicine to decrease the coughing—that is, a sedative cough mixture or cough linctus—can be tried. This disease can also be recorded as "cough."

Whooping-cough.

Definition and Cause.—Whooping-cough is caused by its own special **bacteria.** It is an **infectious** disease. It can be regarded as a special form of bronchitis, for it is the bronchi which are attacked.

It is very common in babies and **young children.** The disease spreads because the bacteria are expelled by coughing and sneezing and travel in the air, which is breathed by other children.

Like ordinary bronchitis, it may lead to broncho-pneumonia, which is almost always the cause of death in this disease.

Symptoms and Signs.—For about a week or two everyone, including the doctor, thinks the child has a severe attack of bronchitis, for at this stage no whooping is heard. Cough and fever are present.

Then the cough starts to occur in **paroxysms**—that is, the child coughs in a paroxysm and is then quite silent for perhaps as long as an hour. The cough is much worse at night. It often produces vomiting. These three facts should suggest whooping-cough. Sooner or later the diagnosis becomes clear, for the child **whoops** at the end of a paroxysm.

Paroxysms of coughing will occur for a month or more, and then slowly become less. Fever usually decreases in the second week, and is absent during the third week. **Broncho-pneumonia** is suspected if, during the second or third week, the child obviously becomes worse, the fever rises, and the pulse and respirations become rapid.

Treatment.—Small feeds should be given at frequent intervals if the vomiting is severe. Special whooping-cough mixtures will decrease the number of paroxysms, but nothing can shorten very much this very troublesome complaint. The child should rest in bed if fever is present; apart from this, it is unnecessary to confine the child to bed. When broncho-pneumonia occurs M. & B. 693 tablets should be tried.

Pulmonary Tuberculosis.

Definition and Cause.—This disease is caused by special bacteria, the **tubercle bacilli,** often called "T.B." These bacteria can invade many parts of the body, but the commonest is the lungs. The disease slowly spreads through both lungs, which are destroyed and large cavities are formed.

Tuberculosis also attacks **bones** and **joints. Lymphatic glands,** especially those in the neck, may be attacked. The **abdomen** may also be affected in abdominal tuberculosis.

Tuberculosis is spread very largely by sputum which contains the bacteria (T.B.). The germs can live for a long time in dark and damp houses, in which it is easy for anyone to contract the disease. The bacilli are quickly destroyed by sunlight.

To prevent this terrible disease, persons must never spit in a house except into the fire. Houses should be constructed with large windows which admit sunlight and ventilation.

Symptoms.—The **onset** of pulmonary tuberculosis is **slow and silent,** the patient noticing very little wrong. He has a cough, and he never loses this cough. He may feel slightly weak. The symptoms are so mild that he does not come to hospital until many months have passed. As the disease starts so slowly, we need never think of this disease if the patient has been ill for less than a month.

Pain is sometimes felt for a few days, and then it goes away. It may occur in any part of the chest.

The signs are those of a **mild chronic fever,** which slowly becomes worse. Some of these signs may be noticed as symptoms by the patient.

At the beginning of the disease the fever is not severe, so that the evening temperature may be only 99° F. (Fig. 24). There are no rigors. The patient may sweat much at night. Later on the fever rises higher, when the disease is spreading rapidly in the lungs (Fig. 24). The pulse-rate is always more rapid than we should expect in so low a fever. When the temperature is only 100° F., the pulse-rate is often

110 to 120. The respiration rate is only very slightly increased, being 20 or 24 a minute. Towards the end it becomes more rapid.

The sputum may be small in amount, clear and thin in the early stages. Usually by the time the patient comes for treatment it is large in amount, thick and muco-purulent. Blood may be present from time to time, either in small drops or a large **hæmoptysis** may occur.

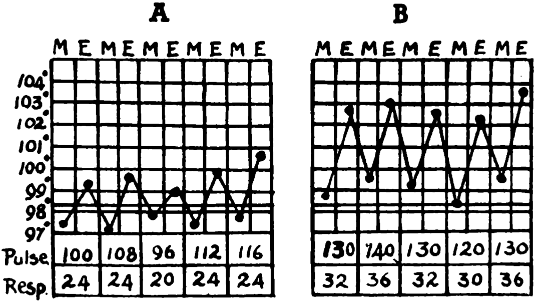


FIG. 24.—TEMPERATURE CHARTS OF PULMONARY TUBERCULOSIS.

A, Early case; B, late case. (A.)

The patient becomes very thin. This **cachexia** is a very constant sign, and should always be looked for. Anæmia may be severe.

Treatment.—The diagnosis is confirmed by **finding T.B. in the sputum.** If pulmonary tuberculosis is diagnosed early and treated thoroughly for at least a year, it may be possible to cure the disease. Many doctors believe that native patients cannot resist the disease. It is certain that most native cases die in a few months or years, but this may be due to the fact that they do not come early for treatment and will not remain a long time under treatment.

The disease is **infectious.** It is spread by the sputum. This is expectorated on to the floor, and the germs can live a long time in dark, damp rooms. They are killed by sunlight. A patient should never spit in a house, but should use a mug. The sputum is then burnt. The patient should not use the same drinking-cup, plates or spoons as other people. He should sleep in a separate hut.

Fresh air, good food and rest are the only three things which will help the body in its fight. Medicines are of little use.

Plenty of **good food** is necessary. This is not just the same as eating many plantains or much maize, but it means that meat, fish or eggs are needed each day. So are milk, cream, or butter. Cod-liver oil is a good food and is not a medicine—at least, as that word is commonly understood. By providing a nutritious diet an attempt is made to increase the patient's weight and his resistance to the disease.

Rest in bed is necessary if any fever is present. The patient should remain in bed for a month after the last occasion on which the evening temperature was over 98·8° F. If when he gets up the evening temperature rises above 98·8° F., he goes back to bed for another month, and then starts over again.

If the patient gains in weight, maintains this gain of weight, and his evening temperatures remain normal and the sputum loses all T.B., the patient is being cured. If the opposite is occurring, the disease is advancing in the lungs.

Plague.

Definition and Cause.—Plague is an infectious disease which affects **rats.** It spreads from rat to rat by means of fleas (Fig. 25, *B*). The germs are called *B. pestis* (Fig. 25, *A*). When a rat dies of plague the **fleas** leave the dead body and find some other host, usually the body of another rat. Occasionally an infected flea may reach a human person, biting him usually on the leg. The bacteria travel rapidly to the nearest lymphatic glands, in which they multiply very quickly. They produce very strong toxins (poisons) which soon damage the heart. The swelling of the gland is called a bubo, and this variety is called **bubonic** plague.

Bacteria may pass rapidly through the glands and enter the bloodstream, producing **septicæmia** and pneumonia. In some cases there is no bubo; the disease begins in the lungs as **pneumonic** plague, which is very fatal.

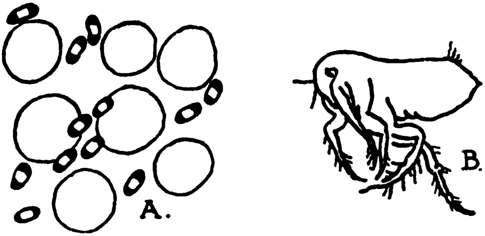


FIG. 25.—PLAGUE.
A, *B. pestis* among red blood cells (× 1,000); B, plague flea (× 8). (A.)

Symptoms.—Two or three days after being bitten by an infected flea the patient **suddenly becomes very ill,** and about the same time he notices an extremely painful swelling in the glands of the groin, armpit or neck. This is the **bubo,** or swollen gland.

Signs.—High **fever** is present, and all the usual symptoms and signs which accompany high fever are found.

The **pulse** is very rapid and soon shows signs of heart failure, becoming 140 a minute, weak and irregular.

The **swollen glands,** which are called buboes, swell rapidly. They are harder and more painful than any other variety of swollen gland. Usually the patient dies before they suppurate. Diagnosis is confirmed by finding plague bacteria in a drop of the fluid obtained by **gland puncture.** About three-quarters of the patients die within three or four days. In pneumonic plague the signs and symptoms resemble those of a rapidly fatal pneumonia. The plague bacteria are found in the sputum.

Treatment.—A case of bubonic plague is not by himself infectious, but his clothing may contain infected fleas. Pneumonic plague is extremely infectious, germs being carried in the sputum and the droplets exhaled in coughing.

Sulphathiazole should be given in full dosage and may cure early cases of bubonic plague. Symptoms, such as headache, the painful glands and heart failure, receive the usual treatment, but no drug can kill the plague bacilli or destroy their toxins. While nursing plague cases precautions must be taken to avoid infection, especially from pneumonic cases. A mask should be worn when in close contact with the patient, or even while in the sick-room.

Cerebro-spinal Fever (Meningitis).

Definition and Cause.—This disease is caused by certain small germs, called **meningococci.** They are found in the throats of carriers who do not suffer from the disease. They escape into the air during talking, coughing and sneezing. The disease spreads easily in **poorly ventilated huts,** especially if the people lie next to one another because they have no blankets and feel the cold. The germs enter the nose and soon spread to the meninges (coverings) of the brain and spinal cord, which become inflamed and produce pus. This mixes with the normal cerebro-spinal fluid to form a milky fluid, as seen at lumbar puncture.

The actual case of meningitis is hardly at all infectious. As epidemics of the disease occur from carriers, the disease is called an infectious fever.

Symptoms.—The first symptoms are those of a **severe fever,** and resemble very closely those of malaria. Headache occurs, with shivering, vomiting and fever. After one or two days signs occur which point to disease near the brain—that is, cerebral signs appear. Some cases die within a day of becoming ill.

Signs.—During the first one or two days the signs are those of a severe general **fever.** Then the following cerebral signs appear. The patient becomes **delirious and very irritable.** He lies curled on his side under the bedclothes. He resents the light, resists examination, and quarrels with anyone who makes the bed. He is noisy and may scream. Later on the delirium quietens into **coma,** and coma increases until death.

Signs of cerebral irritation are shown by the neck muscles becoming stiff. First of all the chin cannot be pushed forward on to the chest, later on the head is pulled backwards. A similar spasticity of the leg muscles prevents full flexion of the leg at the hip.

Treatment.—The case is diagnosed and treated by **lumbar puncture,** which removes the pus which is causing a high pressure inside the skull. The sulphonamides must be given in full dosage. In addition the usual treatment of fever is followed. Special **sedative** medicines may be needed to quieten a delirious patient. Large doses of sleeping draughts, opium and morphia, are the commonest sedatives to be employed. M. and B. 693 tablets should be given in double the doses given in severe pneumonia (see page 126) during the first 24 hours. Then for four days continue giving half the doses given on first day.

Tonsillitis.

The tonsils are the **lymphatic glands** of the throat. Their function is to protect the throat against infection. When infected they become swollen and painful.

Symptoms.—The patient feels **pain in the throat.** This is increased by swallowing, which becomes difficult. Symptoms of **fever** are often present.

Signs.—High **fever** can be present, but the amount of fever varies much from case to case.

When the mouth is inspected, the tongue is seen to be thickly coated with fur, and the breath is foul-smelling. With a spatula both tonsils are seen to be enlarged; they are a dark red colour, and small points of pus may be seen on their surface. The neck glands enlarge near the corner of the jaw. Fever, pain and swelling decrease in a few days.

Treatment.—**Gargles** are used three times a day to wash out the throat. **Mixtures** of chlorates or salicylates are used internally. Sucking an aspirin tablet helps. A purgative may be required.

Hot foments decrease the pain and the swelling of the enlarged glands in the neck.

Chronic Tonsillitis.—Tonsillitis often returns. After many severe or even after many mild attacks the tonsils remain permanently **enlarged.** This is very common in young children. The neck glands remain swollen. Ear trouble (otitis media) also results from this disease. Attacks of coryza, sore throats and coughs are frequent. The only cure lies in the removal of the tonsils by a surgical operation.

Summary.

Coryza:

An infectious disease of the nose and throat due to a virus.

Causes nasal discomfort and discharge.

Treated by aspirin, quinine and nasal drops.

Pneumonia :

Two varieties—Lobar pneumonia commencing in one lobe. Broncho-pneumonia commencing as bronchitis.

Symptoms—Lobar pneumonia: acute onset of fever, pleural pain and cough.

Broncho-pneumonia: the symptoms of bronchitis increase slowly as the pneumonia occurs.

Signs—High fever, rapid pulse, rapid respiration rate, sputum rusty or muco-purulent.

Terminates—Crisis common in lobar pneumonia, lysis in broncho-pneumonia.

Treatment—Rest in bed, fluid diet, increase fluids, cold sponging. Relief of pain by opium and morphia. Full doses of sulphonamides.

Cough medicines are necessary in broncho-pneumonia, little use in lobar pneumonia.

Cough :

Usually a protective reflex action to empty out pus. Caused by — (1) coryza, (2) measles, (3) pneumonia, (4) tuberculosis, (5) whooping-cough, (6) bronchitis, (7) pharyngitis.

Bronchitis :

Cough, sputum, pain under sternum. Not serious except in infants and the aged, in whom it may proceed to broncho-pneumonia.

Pharyngitis :

Cough, little watery sputum, discomfort in throat. Due to smoke and dust. Never serious, but difficult to cure.

Whooping-cough :

An infectious disease of young children due to a special bacteria. **First ten days**—symptoms and signs resemble those of bronchitis. **After ten days**—the cough occurs in paroxysms terminated by a whoop.

Pulmonary Tuberculosis:

An infectious disease due to tubercle bacteria (T.B.) invading the lungs. Spread by inhaling infectious sputum.

Prevented by good ventilation and lighting of houses.

Symptoms—Slow onset of cough, expectoration of sputum; chest pain is variable; hæmoptysis is variable.

Signs—Low fever, rapid pulse, progressive loss of weight, muco-purulent sputum, T.B. found in sputum.

Treatment—Increase general resistance by nutritious diet, rest in bed, open air and sunlight.

Plague:

Two main varieties—(1) Bubonic plague, due to infected fleas biting the body. It may spread to bloodstream, causing septicæmia. (2) Pneumonic plague, a fatal form of pneumonia due to plague bacteria, extremely infectious, spread by inhalation of sputum.

Bubonic Plague.—Fever, toxæmia and hard, painful buboes, usually in groin. Diagnosis by gland puncture.

Treatment by the sulphonamides.

About three-quarters of the cases die.

Cerebro-spinal Fever:

Caused by meningococci. An infectious disease spread by carriers who harbour meningococci in the throat.

Symptoms—Resemble those of malaria: fever, headache.

Signs—Fever, cerebral signs of delirium and irritability, and finally coma.

Treatment—Repeated lumbar puncture. Sedatives. Full doses of the sulphonamides.

Tonsillitis:

An infection of the tonsillar lymphatic glands.

Causes fever, pain in throat, swelling of tonsils, exudate.

Treatment by gargles, mixtures of Pot. Chlor., hot foments.

Chronic tonsillitis is treated by removal of the tonsils.

Questions.

1. Describe in detail the typical history of a patient suffering from (*a*) lobar pneumonia, (*b*) broncho-pneumonia, (*c*) bronchitis, (*d*) whooping-cough.
2. What is the usual treatment of pneumonia as regards (*a*) the nursing care, (*b*) the diet, (*c*) the relief of pain, (*d*) the treatment of the cough ?
3. Explain how a case of pulmonary tuberculosis shows itself in (*a*) symptoms, (*b*) signs, (*c*) fever, (*d*) sputum.
4. How do bubonic plague and pneumonia plague spread ? Explain further how a knowledge of this spread aids in the prevention of the disease.
5. What are the distinctive signs of cerebro-spina fever which distinguish it from other diseases ? What is seen at lumbar puncture ? How does this operation help the patient ?

CHAPTER IX

DISEASES OF THE DIGESTIVE TRACT

Caries — Pyorrhœa — Toothache — Stomatitis — Pain in the abdomen — Indigestion — Diarrhœa — Dysentery — Constipation — Ascites — Tapeworm — Roundworm — Hookworm — Threadworms — Bilharzia.

Caries.

Definition and Cause.—Caries signifies that there is decay of the teeth. Small holes, which are often black, appear. It is common in children. The cause of the disease is not clearly understood. One of the **vitamins** which is present in the fat of our foods helps the teeth to grow. If the diet of a growing child does not contain this vitamin, the teeth are not strong and decay easily. **Sunlight** on the bare skin also forms this vitamin, so that African children do not often suffer much from this disease. Regular **cleaning** of the teeth helps to prevent the disease.

Symptoms and Signs.—Nothing may be felt by some patients, others suffer much from toothache. The decay in the teeth can easily be seen.

Treatment.—This disease cannot be cured by medical orderlies. Regular cleaning of the teeth, especially after food, helps to control the decay. Patients often ask to have a badly affected tooth removed. Unfortunately, this may be very difficult if the tooth has already a large hole in it.

Pyorrhœa.

When a person becomes old, pus often forms between the teeth and the gums. This is a very common condition in persons over thirty years of age, and is called pyorrhœa.

Symptoms.—Pyorrhœa usually produces no symptoms, and most patients do not know that they have the disease.

Signs.—Pus can be seen as a yellow line between the teeth and the gums. The disease starts at the lower incisor (middle) teeth. In the end the teeth become loose. The pus is swallowed into the stomach and may produce indigestion. The poisons formed in the pus are absorbed into the blood and, travelling to the joints, may cause chronic rheumatism.

Treatment.—If many teeth are severely affected, no treatment will succeed except the removal of the teeth. Native patients usually refuse this because if they have no teeth they cannot eat. They usually only come for treatment when a tooth is very loose and they wish to have this one removed. This is very easy to do.

In the early stages of the disease regular mouth washes and rubbing the gums with cotton-wool swabs will decrease the amount of pus formed, but it will not cure the disease.

Toothache.

This is not a disease but a symptom, like pain in the chest. The common cause is **caries,** which produces a painful cavity. This is best treated by cleaning out and stuffing the cavity with a small piece of cotton-wool soaked in carbolic lotion (1 in 20) or some other variety of tooth drops.

Another cause of severe toothache is due to an **abscess** (dental abscess) forming in the gum around a tooth which usually contains a cavity. All the signs of an abscess develop suddenly—namely, swelling, pain, and heat. The abscess is drained by removing the tooth or by an incision. If this cannot be done, hot fomentations help the abscess to burst quickly.

Bismuth and mercury, if given in large doses, produce **stomatitis** and acute pyorrhœa. All the teeth are very painful, mastication is impossible, and salivation is excessive. A dark blue line appears at the edge of the gum and near the teeth.

Stomatitis.

Stomatitis means inflammation of the mouth. There are three different varieties, which will be discussed separately.

Ulcerative Stomatitis.—This is common in young **children.** Many small red ulcers form on the tongue and lips. Treatment consists in applying glycerin and borax three times a day.

Thrush.—This is common in very young and weak **babies,** and especially those which are bottle-fed. White patches form on the tongue and lips. They can be removed with difficulty, and leave a raw bleeding surface. Treatment consists in applying glycerin and borax at frequent intervals.

Stomatitis due to Bismuth or Mercury.—Bismuth is given as an injection in the **treatment of yaws and syphilis.** Mercury is given in many different ways in the treatment of syphilis. Both of them produce stomatitis if they are given in large doses, especially if the patient has pyorrhœa.

The teeth become very tender. Eating is painful. Much saliva is formed.

The gums around the teeth become very red, swollen, and tender. Pus forms between the teeth and the gums. A dark blue line forms along the edge of the gums.

The drugs which cause this disease should be stopped as soon as signs of stomatitis appear, and intravenous injections of sodium thiosulphate should be given. Mouth washes should be used frequently.

Pain in the Abdomen.

A large number of patients complain of pain in the abdomen. They should then be questioned for

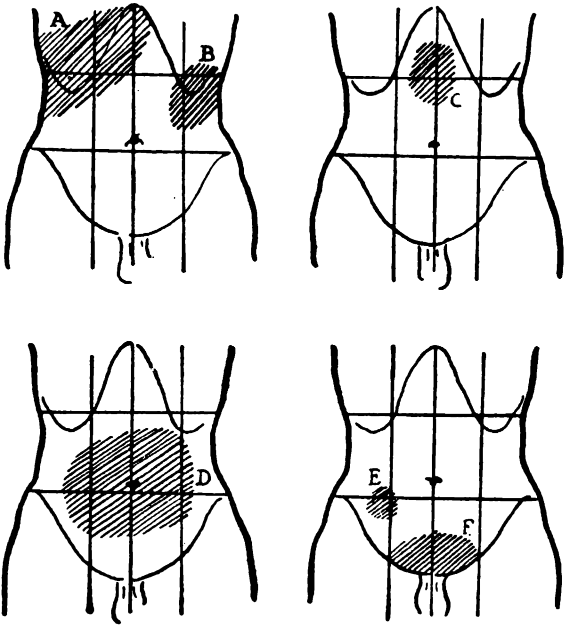


FIG. 26.—ABDOMINAL PAIN.

A, Liver; B, spleen; C, indigestion and stomach; D, colic and small intestine; E, appendicitis; F, bladder and uterus. (A.)

the symptoms of abdominal disease (p. 12). The following varieties of pain are met (Fig. 26):

Colic.—Colic is usually due to worms, diarrhœa, dysentery, or constipation. In young babies colic is frequently due to unsuitable feeding. If the cause of the colic can be found, treat the cause; if the cause cannot be found, then no disease can be diagnosed, and the symptom of colic is recorded in the register. After excluding the possibility of an acute abdomen (p. 82), a purgative can be given. The commonest cause of colic is the helminthic worms, yet without a microscopical examination of the stool it may be impossible to diagnose their presence.

Distension and a Feeling of Distension.—If distension is seen, think of the letter "F," the causes of a full abdomen being Fluid, Flatus (gas), Fæces, Fœtus, Fat, and Tumours. **Fæces** accumulate in constipation, and the distension disappears after an enema or a purgative. **Flatus** should disappear after an enema or purgative. It should be possible for a dresser to distinguish between fluid, a **fœtus** and **fat.** Fluid feels like fluid. **Tumours** or masses may be felt in the abdomen. If the cause of the distension is not known. the best thing to do is to give an enema. Then, if the distension does not disappear when the bowels have been opened, send the case to hospital. The only conditions that can be cured in a dispensary are those due to the presence of flatus and fæces.

Sometimes the patient feels distended after eating, but no swelling can be seen. This should always suggest the presence of helminthic worms.

Pain and Tenderness over a Certain Organ.—**Pain due to the spleen** is situated in the left and upper part of the abdomen. The spleen is tender when it is palpated. This is common in malaria.

Pain due to the liver is felt along the edge of the lower right ribs and at the top of the abdomen. This part is also tender. It is common in malaria, especially if bile is vomited, and also in any disease which attacks the liver, such as amœbic dysentery and relapsing fever. Heart failure with œdema causes a painful enlarged liver. Quite often no cause can be found for a painful swollen liver; then the disease may be called hepatitis and treated by frequent small doses of a purgative.

Pain over the large bowel is felt in dysentery and bilharzia.

Pain due to an abdominal abscess is considered under the section on the acute abdomen (p. 82).

Pain at the bottom and centre of the abdomen is usually due to disease of the bladder (cystitis) or of the uterus.

Pain at the bottom and to one side of the abdomen in the female is usually due to inflammation in the Fallopian tubes of the uterus (salpingitis).

Indigestion.—A large number of people suffer from pain in the abdomen for which no cause can be found. If the cause is unknown, so also is the cure. Vague indefinite pain may in some cases be found to be associated with food, the pain coming either before or else after food. Such cases may be said to be suffering from indigestion. But a large number of cases cannot reasonably be said to be suffering from indigestion, and it is very difficult to know what to call their disease. It is our custom, however, when in doubt, to call them indigestion, and to treat them accordingly with bismuth and soda mixtures. Most cases are due to helminthic worms, which should be treated; if that too fails, they should be sent to hospital for investigation.

Diarrhœa.

Definition and Cause.—Diarrhœa is a common disease in hot climates. It is caused by **stale food, dirty food and water, flies** and **dust.** It is seldom fatal in adults, but in young **babies** it can easily and quickly kill. The common causes of diarrhœa in young babies are too much food—even if it is good food such as the mother's milk—or unsuitable food, which is food that cannot be digested by a young baby. A very large number of **febrile diseases** can produce diarrhœa as one of their symptoms, examples being malaria and pneumonia. This diarrhœa is seldom severe, and is cured by decreasing the amount of food eaten.

Symptoms and Signs.—The chief symptom and sign is frequent **watery stools.** In babies the colour may be green, but in adults there is seldom much change in colour.

Severe **colic** is usually felt in the abdomen.

Vomiting is not common in adults unless the disease is severe, but is common in the diarrhœa of babies. In them it is a very serious sign, for then it becomes impossible to give them either medicines, food or drink. Slight fever may be present.

If the diarrhœa and vomiting are severe, other signs appear in young **babies.** Collapse occurs and they become cold. The face becomes thin and the eyes sink in. The child gives a feeble cry. The skin, when pinched, stands up like a piece of cloth. The pulse is very rapid and weak.

Treatment.—Mild diarrhœa in an adult is seldom serious and often cures itself, for the loose and frequent stools remove the cause of the irritation. An ounce of **castor oil** helps this action of the bowels. A fluid diet and little food should be taken until the diarrhœa ceases. If the diarrhœa continues, **astringent medicines** may be taken.

Severe diarrhœa in young babies is common and it can kill. It is more severe in any baby which is not fed by the mother's milk. Give a drachm of castor oil and stop all food for at least twenty-four hours. During this time give as much boiled water as the baby can take, feeding it with a teaspoon every hour.

The mother may then continue to breast feed her baby, but should give very small feeds. Before each feed give several teaspoonfuls of boiled water to decrease the amount of food taken. All cow's milk and tinned milk should be stopped completely until the diarrhœa ceases. Keep the child warm. If collapse occurs, give every quarter of an hour two teaspoonfuls of water which has been previously boiled. If vomiting then continues, the only hope is a subcutaneous injection of saline, 3 to 5 ounces for a child one year old. Stimulants are useful in collapse.

All this nursing treatment, which can be done efficiently only in a hospital, is much more important than any medicine given. If improvement does not occur on the second day, the baby must be sent to hospital. Malaria can frequently cause severe diarrhœa and green stools in young babies, and in these cases quinine as an intramuscular injection is an urgent necessity.

Dysentery.

Definition and Cause.—If bacteria, parasites or worms irritate the large bowel, then mucus, pus and blood escape into the stool and the bowels act frequently. Diarrhœa is a disease of the small intestines, dysentery is a disease of the large bowel. There are many varieties.

Certain bacteria produce **bacillary** dysentery. A parasite called the amœba (*E. histolytica*) causes **amœbic** dysentery. The schistosoma worm causes **bilharzia** (rectal schistosomiasis); this is another form of dysentery. Other **worms** such as ascaris and the tapeworm can cause dysentery, so can **malaria.**

Symptoms.—The patient feels severe abdominal pain which is really due to **colic.** He notices that he is passing **frequent stools,** so that he thinks it is the commoner disease of diarrhœa, and he may be treated for this during the first one or two days. Within a day or two he starts to pass **mucus, pus** and **blood,** but it is the bright colour of the latter which makes the patient recognize that he has dysentery.

Signs.—The stool in dysentery always contains mucus. If pus is present, the mucus is whitish and not clear. Blood colours both pus and mucus red; it is usually, but not always present.

1. **Bacillary dysentery,** like all acute inflammations, **starts suddenly. Fever** is present during the first few days. The stools are frequent, being usually more than six a day during the first few days, but at the end of a week the patient is beginning to improve. It does not relapse.

2. **Amœbic dysentery starts slowly, lasts a long time,** and has many relapses. Slight attacks of diarrhœa, followed by intervals of apparently normal health, precede the attack of dysentery. There is **no fever.** The disease is usually mild, producing only a few stools each day; usually less than six are passed in the twenty-four hours. It lasts a long time unless emetine is given.

3. **Bilharzia** produces a severe dysentery. Much **blood** is lost. Fever is present. The disease does not improve until tartar emetic injections are given.

4. **Malarial** dysentery is not very severe as far as the dysentery is concerned, but the patient may be very ill from the other symptoms and signs of malaria. Bile is present in the vomit and the stools are also green, for much bile is passed. Vomiting is not common in other forms of dysentery.

It is impossible without the aid of a microscope to distinguish the different varieties of dysentery, but the facts mentioned above may be of some help.

The common forms of dysentery are the bacillary and the amœbic. In many parts there is no bilharzia, in other parts it is extremely common.

Treatment.—Each variety of dysentery has a different treatment; but if a microscope cannot be obtained and diagnosis by means of the laboratory reports cannot be made, proceed as follows:

Give an ounce of **castor oil.** Put the patient to bed. Give a **fluid diet.** Give Mist. **Sod. Sulph.** 1 ounce four or five times a day, or Mist. Mag. Sulph. 2 drachms for a corresponding number of times. This was the treatment of bacillary dysentery until sulphaguanidine (20 to 30 tablets daily) became the modern treatment. If no improvement occurs in a week, give **emetine** injections, 1 grain a day, subcutaneously or intramuscularly, for ten days. This is the treatment for amœbic dysentery, and it will cause very great improvement within five days if this disease is present.

If bilharzia is common in the part of the country in which one is working, tartar emetic injections may be required (p. 160).

Any case which does not improve quickly should be sent to the nearest hospital for thorough examination.

Constipation.

Definition and Cause.—Constipation indicates that there is delay in the passage of fæces along the large bowel. Obstruction of the intestines (p. 83) means that the bowel is completely blocked, and is a very serious illness.

The stools are formed from that part of the food which cannot be digested and absorbed. The stools, therefore, vary according to the diet. Tribes which live entirely on blood and milk can digest all the food, and only a small amount of fæces is formed.

They suffer from constipation. For the same reason anyone who takes only a little food because of fever or abdominal pain is constipated. Tribes which take foods which contain many skins and fibres—*e.g.*, beans, maize, etc.—pass a bulky stool. They have two or three stools a day, and think, incorrectly, that they are constipated if they produce only one stool a day.

Constipation means in actual practice that the bowels are not opened during one complete day. All people pay great attention to the action of their bowels, and many patients come for treatment if they feel that their bowels have not acted as freely as they would like. They only need to be reassured.

Symptoms.—The patient notices the constipation, and usually no other symptoms occur. A few patients feel uncomfortable and distended in the abdomen. Some get colic. A few suffer from headache.

It is important to be certain that no serious disease is present, like pneumonia, which is causing constipation. Intestinal obstruction must also be excluded.

Treatment.—Constipation is easily overcome in two ways. **Purgatives** such as Mag. Sulph. and castor oil act from above. An **enema** acts from below.

If constipation has become a habit, alter the **diet,** so that more vegetables and other foods containing skins and fibres are eaten. A small daily dose of salts may be required. Pregnant women often suffer from constipation, so may women who have borne many children. A pregnant woman should never be given a strong purgative. This may produce a miscarriage.

Mothers often bring their **babies** because they have passed only very little stool. This requires no treatment, and purgatives are bad for babies. Even if constipation is really present—that is, one complete day has passed without a stool—the mother should wait a second day before a purgative is given. Then scrape a little soap on to the finger-nail and push it into the rectum. This acts like a small enema. If the baby is always constipated, give olive oil, 1 drachm twice or thrice a day. If the constipation is very severe, give ½ drachm of castor oil, but remember that it is bad to give this often to babies.

Ascites.

Definition and Cause.—Ascites means fluid in the peritoneal cavity between the intestines and the abdominal wall.

It may be caused by many diseases, and is not by itself a disease, but only a sign. When either the **heart** or the **kidneys** is seriously diseased and failing in its function, fluid gathers in all parts of the body and is called œdema. Ascites is in such cases only a part of the general œdema. Certain diseases of the liver, such as **cirrhosis,** produce ascites in the abdomen. Tuberculous disease of the abdomen also produces ascites.

Symptoms and Signs.—The patient complains of **distension** of the abdomen, and this distension can be seen by the dresser. It is thus quite different from a feeling of distension with no accompanying swelling; this is common in intestinal worm infections.

The whole of the abdomen is swollen. If much fluid is present, it gives a peculiar sensation when struck with a finger. It shakes like a bag full of water. This is called a **fluid thrill.**

Treatment.—Ascites is a serious condition. It cannot be cured at an out-patient clinic. The patient must be sent to a large hospital where the fluid can be removed by **tapping** (paracentesis). Even there not many patients are cured, as it is difficult to remove the cause of the ascites, so the fluid tends to recur. Mersalyl injections reduce the amount of fluid.

Tapeworm (Tænia).

Life History.—A fully grown tapeworm measures from 10 to 25 feet, and it lives in the small intestine. At the beginning of its body there is a small **head,** which is only slightly bigger than the head of a pin (Fig. 27). This head sticks firmly to the inner wall of the intestines. From the head and neck are formed the young **segments,** which at first are about the size of a very small bead. They travel downwards along the body of the worm, due to fresh segments forming above them. As they move downwards they increase in size. When they reach the tail they are about 1 inch long and ½ inch wide, and are flat like a piece of tape. There they break off, and are seen as white moving objects in the stool.

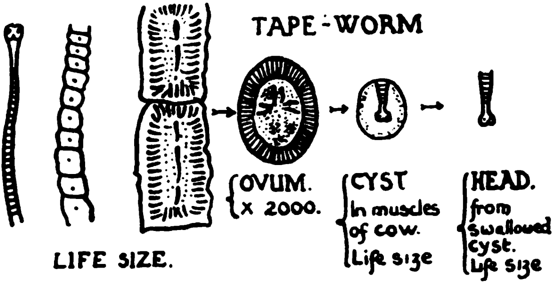

TAPE-WORM
OVUM. x 2000.
CYST In muscles of cow. Life size
HEAD. from swallowed cyst. Life size
LIFE SIZE.

FIG. 27.—TAPEWORM, SHOWING HEAD, MIDDLE SEGMENTS, TAIL SEGMENTS, OVUM AND CYST. (A.)

Each segment contains a large number of **eggs** (ova). When a patient passes his stool on to the grass, cattle eat the eggs. The tapeworm eggs then undergo a further development in the cattle. Many changes occur, but in the end they develop into **cysts** which form in the muscles of the **cow.** These are white round masses about ¼ inch in size.

If one of these cysts is eaten by a man, a tapeworm develops in his intestines, the cyst forming the head of the new worm.

Symptoms.—Patients who have tapeworm often complain of no symptoms, and are surprised when they see **segments in the stool.** They may even not agree when we tell them that the microscope says they have a tapeworm.

Some patients notice slight abdominal symptoms, such as noises in the intestines and slight pain called indigestion. They often have a poor appetite, and feel distended after even a small meal. Patients who have these symptoms often come for treatment, but they never mention that they have seen tapeworm segments in the stool. They must be strictly questioned before they state this fact.

If in doubt, have the stool examined by a microscope. If this cannot be done, give a large dose of salts and instruct the patient to watch all his stools. Segments will appear unless the worm is young and short, in which case the tail segments will not break off.

Treatment.—It is necessary to remove the head in order to cure the patient. Any purgative will break off the tail, but then the worm will only grow again.

Success depends on an empty bowel. This is achieved by **purging and starving.** Most patients do not consent readily to this, so treatment does not expel the head.

Give the patient a large dose of salts (Mist. Mag. Sulph. 2 to 3 ounces) when he first attends. After this he should take fluids only, such as water, tea or milk, during the remainder of the day. Next day give **male fern** mixture (Mist. Filix Mas) 1 ounce, and then an hour later another large dose of salts. **Carbon tetrachloride** also removes tapeworm; 30 to 60 minims can be given with the salts.

Roundworm.

Life History (Fig. 28).—Roundworm is about as long and as thick as a pencil. It is the colour of a European skin, so most tribes call it the red worm.

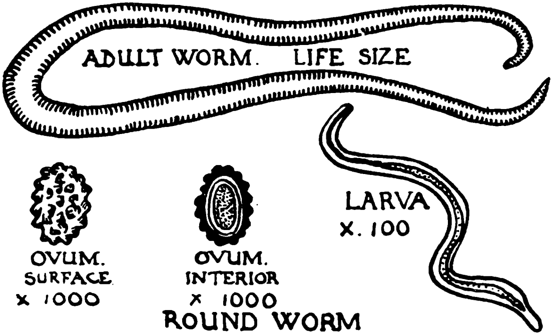


FIG. 28.—ROUNDWORM, SHOWING ADULT WORM, OVUM AND LARVA. (A.)

The worm lays many **eggs** (ova), which can be found in the fæces when they are examined by the microscope.

The eggs develop in warm, damp **soil.** They enter the mouth in various ways; in children it is usually by means of the fingers, which become contaminated while playing on infected ground. Children suffer more commonly from this disease than adults. When ova are swallowed they develop into larvæ in the intestines.

Symptoms.—Most children who have roundworms **complain of nothing,** and in some parts of the country almost every child has this disease.

Some children feel **colic** or vague abdominal pain. They may not eat well. They may vomit, get **diarrhœa** or dysentery.

Often nothing is known about the roundworms until one appears in the stool. It may be vomited, and this is the only worm which can be vomited. During fever the roundworms commonly leave the body and appear in the stools.

Signs.—Roundworms produce no signs in the abdomen except that a certain generalized fulness may be noticed. This swelling of the abdomen is called **pot-belly.**

The only certain method of diagnosis is a stool examination by the **microscope.** If one worm has been seen in the stool, it is usually true that there are several more inside the abdomen.

Treatment.—Two drugs are very useful in removing these worms. The first drug is **Santonin** (½ grain for each year up to a maximum of 5 grains). This is usually given with calomel or castor oil once a day for three days. The second drug is **Oil of Chenopodium** (½ minim for each year up to a maximum of 15 minims for an adult). This is usually given once only in Mist. Mag. Sulph. (1 drachm for each year of the child's age up to a maximum of 2 ounces for an adult). Carbon tetrachloride should not be given, as it is said to produce toxic effects in patients who suffer from roundworm.

Hookworm (Ancylostoma).

Life History (Fig. 29).—Hookworms are very small, and can only just be seen by the eye. They are never noticed by the patient in the stool. They are about **half an inch long** and as **thin** as a pin.

They live in the small intestine, fixing themselves by their hooks to its inner wall, and sucking the blood of the patient. Very many, even hundreds

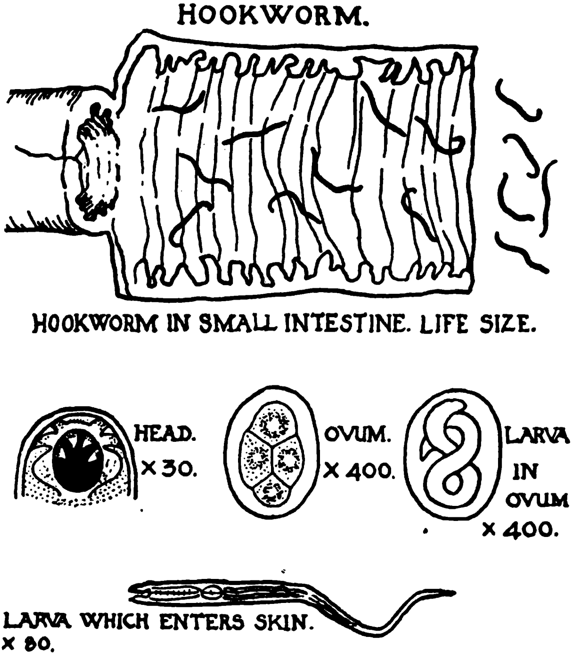

HOOKWORM.
HOOKWORM IN SMALL INTESTINE. LIFE SIZE.
HEAD. × 30.
OVUM. × 400.
LARVA IN OVUM × 400.
LARVA WHICH ENTERS SKIN. × 80.

Fig. 29.—Hookworm, showing Adult Worms, Head, Ovum and Larva. (A.)

of them, may be present. They cause severe anæmia in the patient due to the loss of blood.

They lay **eggs** (ova) which escape in the stool, in which they can be found by means of the microscope. The eggs can develop on damp, shaded **soil.** After certain changes they enter the body by **piercing the**

skin of any foot which is resting on them. They travel to the intestines, causing usually no symptoms either where they enter the skin or where they travel in the body. Some itching may be noticed in the skin of the feet.

Symptoms.—These worms do not usually cause symptoms in the abdomen. Hundreds of worms may be present without the patient's knowledge, and since the patient never sees the worms when they are passed during treatment, it is best not to mention the word " worms." He will disagree with the diagnosis, and then may say that treatment has expelled none.

A few, but very few, patients feel **slight indigestion,** hear noises in the abdomen and feel full after meals. Others complain of **palpitations,** headaches, dyspnœa, swelling of the feet and malaise due to the **anæmia.** In fact, unless these symptoms of anæmia occur, the patient usually notices nothing.

Signs.—If no anæmia is present, this disease produces **no signs.** The eggs are found in the stool—that is all.

Sometimes **anæmia** develops. This is due to the worms, which are sucking the patient's blood by day and by night. The symptoms and signs of anæmia are, briefly, lack of strength, **swelling of the legs and face** due to œdema, a rapid pulse and palpitations and dyspnœa after exertion. The **pale colour** of the blood is seen in the blood of the everted lower **eyelid** and in the **gums,** lips and tongue.

Treatment.—Two drugs are used in this disease, and will, usually in one dose, remove many of the worms. They may be given separately, but are probably safest when given together.

They should be given early in the morning, no food having been taken that day. They are dangerous for old people, for persons who take alcoholic drinks, for pregnant women and for anyone suffering from any serious disease. After these drugs have been taken no alcohol at all should be taken for two days, or death may result. If a few hours after these medicines are given severe vomiting, abdominal pain or collapse occur, the patient has been poisoned by the drug. If this occurs, put the patient to bed and get him warm. Give an enema at once, and give 3 ounces of Mist. Mag. Sulph., well diluted with water, by mouth. Give stimulants, but no brandy. If possible, summon a doctor.

The first drug is **Carbon Tetrachloride** (30 to 60 minims), given in 2 or 3 ounces of Mist. Mag. Sulph. The second drug is **Oil of Chenopodium** (5 to 15 minims), given in the same amount of salts.

These drugs may be combined by mixing in a small bottle 1 ounce of oil of chenopodium and 3 ounces of carbon tetrachloride. They mix fairly well, but the bottle must always be well shaken before a dose is poured out. The dose of this mixture of the two drugs is from ½ to 1 drachm for an adult, and is given in 2 or 3 ounces of Mist. Mag. Sulph. These two drugs will deal with hookworm, roundworm and tapeworm. It is therefore the best dispensary worm medicine; it will deal with almost any worm which the patient has. Children can be given this mixture, 2 minims for each year of the child's age.

In a dispensary it may be impossible to distinguish between tapeworm, roundworm or hookworm, owing to the absence of laboratory facilities. The disease should then be called "helminths," which means worms, and treated with this mixture.

Cases of hookworm disease are seldom cured after only one administration of carbon tetrachloride and oil of chenopodium. If anæmia is present no benefit is noticed until this is cured by a long course of iron (p. 169).

Threadworms.

Life History (Fig. 30).—Threadworms are ½ inch long, as thick as a piece of thread and **white** in colour. They can be seen moving **on the surface of a stool** which has been recently passed. The worms live in the large bowel, and come out of the anus at night to lay their **eggs** on the skin of the **buttocks.** These parts of the body are so irritated that they are scratched by the patient, who then carries the eggs on his fingers to his own mouth. The disease is common in children who suck their fingers.

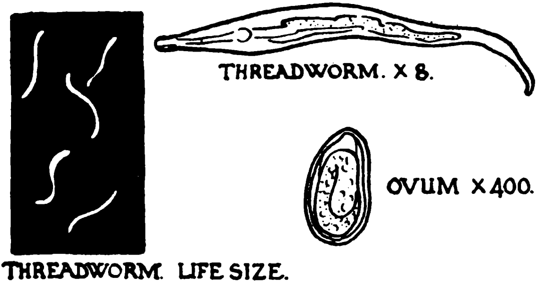


Fig. 30.—Threadworms, showing Adult Worms and Ovum. (A.)

Symptoms and Signs.—The only symptom is the **itching near the anus.** The sign is the **white worms moving on the stool.** The ova of the worms may be found in the stools. Often they are absent, and are only found by examining scrapings from the skin of the buttocks.

Treatment.—An enema is given each day until cured. It may contain common salt (20 per cent.), Infusion of Quassia, or it may be an ordinary soap and water enema. Gentian violet tablets of ½ grain are given thrice daily for five days, and have been found to be the most effective form of treatment; and have largely replaced the use of other drugs, such as oil of chenopodium, by the mouth.

Bilharzia (Urinary and Rectal Schistosomiasis).

Life History (Fig. 31).—The worms which cause these diseases are about the size of threadworms, but they live in the veins of the pelvis. There are two varieties—*Bilharzia mansoni*, which lives in the veins of the large bowel and the rectum and causes rectal schistosomiasis; and *Bilharzia hæmatobium*, which lives in the veins of the bladder and causes urinary schistosomiasis.

The worms lay **eggs** (ova), which pass through the wall of the rectum or bladder to escape from the body in the stool or the urine. They develop in certain **snails** which live in rivers and pools. People who stand in the water become infected, the parasite entering **the skin of the leg.**

In some parts of Africa the disease is very common, in other parts it is rare; this depends on whether a suitable variety of snail is present.

Symptoms.—The **rectal variety** of bilharzia causes the symptoms and signs of severe **dysentery.** It can be diagnosed only by microscopical examination of the stool, by which the distinctive eggs are found. The **urinary variety** causes **blood** from time to time to appear in the **urine.** Usually nothing else is noticed by the patient; there is no pain and no urethral discharge, such as occur in gonorrhœa. A diagnosis is made by finding the eggs in the urine.

Treatment.—**Tartar emetic** is a very effective drug in this disease. It is given as an intravenous injection. If any of the fluid escapes outside the vein, it causes much pain and swelling. The tartar emetic solution must be prepared fresh each day; if kept a few days it decomposes and becomes poisonous.

Even when a fresh solution is prepared signs of poisoning may occur immediately following the injection. They are coughing and vomiting, and these show that subsequent doses should be decreased.

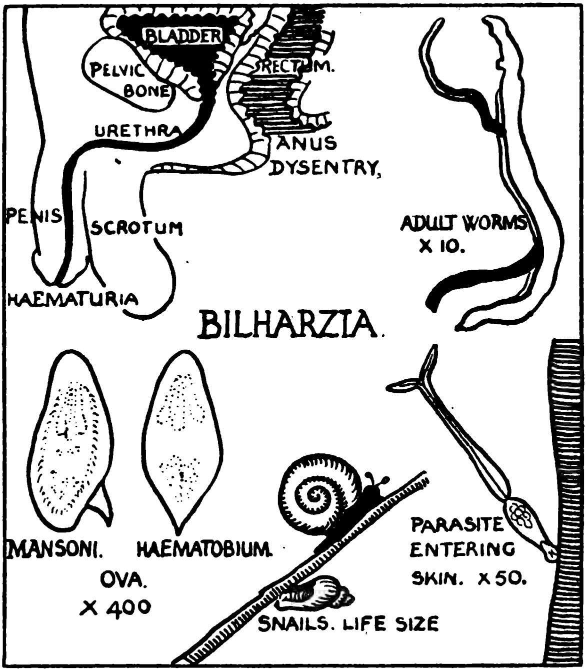


FIG. 31.—BILHARZIA.

Diagram of the urinary tract and rectum, showing the parts (black) which are attacked in urinary and rectal bilharzia. Adult worms, ova, snails, and parasites. (A.)

A **course of injections** are given, one injection every second day. The dose for an adult starts at ½ grain, and is increased by ½ grain until the maximum of

2 or 2½ grains is given in one injection. The course varies from six to ten injections. Several courses may be needed to effect a complete and permanent cure.

Summary.

Caries.

Decay of the teeth due to lack of cleanliness and defective diet. **Cavities** appear. Pain is variable.

Pyorrhœa.

A common disease of **old age.**

Pus forms between gums and teeth; the latter loosen.

No symptoms except those of indigestion and perhaps rheumatism.

Stomatitis:

Ulcerative stomatitis—Common in children; many small red ulcers form on the tongue and gums.

Thrush—Common in babies; white patches form on the tongue and lips.

Bismuth and Mercury—Due to excessive dosage, generalized redness, tender teeth, blue line in gums.

Abdominal Pain.

1. **Colic**—Intermittent generalized pain, due to diarrhœa, dysentery, intestinal worms or constipation.
2. **Distension**—Due to excess of fæces, flatus, fluid, fœtus or fat, also abdominal tumours. Sensation of distension, but no visible swelling, is commonly due to intestinal worms.
3. **Pain over an inflamed organ**—Spleen, liver, large bowel, bladder, Fallopian tube, uterus.
4. **Indigestion**—An indefinite group.

Diarrhœa.

Cause—Stale food, infected food or drink, unsuitable food for infants.

Symptomatic diarrhœa common in any fever, especially malaria and pneumonia.

Symptoms and Signs—Watery, frequent stools, colic. In **infants** vomiting and collapse are common.

Treatment—In adults light diet, castor oil, and astringent mixtures.

In **babies**—No milk for twenty-four hours, after which increase slowly; castor oil, astringent mixtures.

Dysentery.

Causes—Bacillary dysentery, amœbic dysentery, bilharzia, intestinal worms, malaria.

Symptoms and Signs—Colic, frequent stools, which soon contain mucus, pus, and blood. Fever only common in bacillary, malarial, and bilharzial varieties.

Diagnosis of the different varieties usually impossible unless a laboratory can report on microscopical changes in the stool.

Treatment—All varieties, rest in bed, light diet, and at first castor oil.

Bacillary dysentery—Sulphaguanidine or salts.

Amœbic dysentery—Emetine 1 grain daily by injection.

Constipation.

Cause—Delay in the passage of fæces along the bowel due to defective diet, insufficient food or exercise, and any severe fever.

Symptoms—Usually nothing except the constipation.

Treatment—Purgatives or enemata. If constipation is habitual, alter the diet.

Ascites.

Cause—Fluid in the peritoneal cavity due to the generalized œdema of heart and kidney disease; also in cirrhosis of the liver.

Signs—Distended abdomen and fluid thrill.

Treatment—Tapping and mersalyl injections.

Tapeworm.

Life History—Adult worm lives in small intestine of man, and consists of head and segments which contain ova —> grass —> cow —> cysts in the muscles of the cow —> man.

Symptoms—Segments in stool and indigestion.

Treatment — Preliminary purging and starvation by mist. mag. sulph., then mist. filix mas, and subsequently mist. mag. sulph.

Roundworm.

Life History—Adult worm in small intestine —> ova —> develop in soil —> fingers of child —> mouth —> adult worm.

Signs—Often nothing noticed; colic, diarrhœa, worms passed in stool or vomited.

Treatment—Santonin up to 5 grains and oil of chenopodium up to 15 minims, according to age.

Hookworm.

Life History—Many small worms adhere to the wall of small intestine —> eggs —> damp soil —> pierce skin —> abdomen.

Symptoms—Indigestion and those of anæmia: palpitations, dyspnœa, œdema of legs.

Treatment—Carbon tetrachloride, 30 to 60 minims in salts. Oil of chenopodium, 5 to 15 minims in salts.

Threadworms.

Life History—Adult worms live in the large bowel and rectum; emerge at night to lay eggs on buttocks; eggs conveyed on fingers to mouth.

Treatment—Gentian violet tablets, enemata.

Questions.

1. Write notes on (*a*) abdominal distension, (*b*) thrush, (*c*) threadworms, (*d*) indigestion.
2. Describe the treatment of (*a*) hookworms, (*b*) tapeworm, (*c*) ascaris.

3. State various causes of (*a*) diarrhœa, (*b*) constipation, (*c*) colic.
4. Mention the various points in the treatment of a case of diarrhœa and vomiting in an infant.
5. Describe the development of (*a*) tapeworm (*b*) ascaris. Illustrate from this life history the method of prevention of these diseases.

CHAPTER X

SPECIAL MEDICAL DISEASES

Respiratory diseases: Asthma—Pain in the chest. *Circulatory diseases:* Anæmia—Heart failure—Œdema. *Jaundice. Nervous diseases:* Epilepsy—Convulsions—Coma—Headache. *Skin diseases:* Impetigo—Eczema—Acne—Scabies—Jiggers—Ringworm. *Filariasis and elephantiasis.*

RESPIRATORY DISEASES

Asthma.

Definition and Cause.—This is a peculiar disease, the cause of which is not clearly understood. Certain people appear to be born with a tendency to develop asthma, and this usually lasts all their life. When certain things such as dust from grass or animals enter the **bronchi,** they become **irritated** in a peculiar manner. The smaller bronchi **contract** in size so that it is difficult for sufficient air to pass. Everyone who suffers from this disease is irritated by different things, and it is usually impossible to find which are responsible.

Symptoms and Signs.—The patient has **attacks of dyspnœa** which **start at night** and last only a few hours. They occur during most of the patient's life. The patient goes to bed feeling quite well. In the middle of the night he wakes up very frightened, for he feels that he is dying because something is choking him. He sits up and struggles to the door, which he opens. He puffs and pants and blows as if attacked by an unseen enemy. When the morning comes the breathing usually gets much easier.

If a patient is seen in the middle of an attack the picture can never be forgotten. He **breathes with difficulty,** and **wheezing noises** are heard coming from his chest. He does not cough much, and his cough produces nothing until the end of the attack, when a small piece of tough mucus may be expectorated.

A similar disease called **hay fever** occurs in the nose. The patient gets what might appear to be coryza. He is always **sneezing** and his eyes run tears. His nose is blocked up.

Treatment.—Sometimes a change of house, especially to one high on a mountain, causes the attacks to become less or even disappear. Patients should eat a small meal at night.

Special asthma **mixtures** will ease an attack, and can be taken for long periods of time to prevent an attack.

During a severe attack certain special injections can give relief. Drugs used include **atropine, morphia,** and **adrenalin.** The great difficulty is to prevent future attacks.

Pain in the Chest (Fig. 32).

This is not one disease, but one symptom of many diseases. It is often very difficult to find the cause of pain in the chest, although it is one of the commonest complaints. The following varieties are frequently seen:

Pain associated with Coughing.

Bronchitis (Fig. 32, A) is a very common disease. It causes pain in the front of the chest, high up, in the middle or on both sides. Thick sputum is produced.

Frequent coughing (Fig. 32, B), whatever the cause, may cause pain in the muscles used in coughing—that is, low down on each side of the chest.

Lobar pneumonia (Fig. 32, C) causes very severe pain in one side of the chest, which becomes worse on coughing or deep breathing. The other symptoms and signs of pneumonia are present.

Pleurisy (Fig. 32, C).—This is an uncommon disease, usually due to tuberculosis. A pain similar to the pain of lobar pneumonia occurs, but the other symptoms and signs are absent.

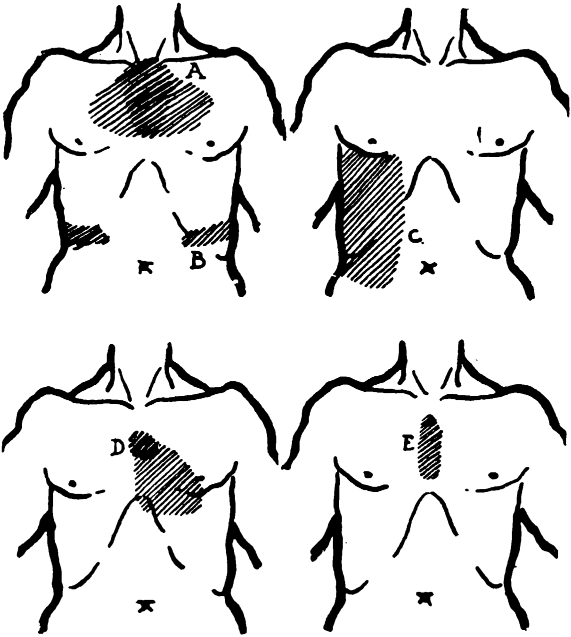


FIG. 32.—PAIN IN THE CHEST.

A, Bronchitis; B, repeated cough; C, pneumonia and pleurisy; D, heart disease; E, pain in the chest. (A.)

Pain not associated with Coughing.

A very large number of Africans complain of pain in the chest, yet they do not cough, and when a doctor examines the chest **nothing wrong is found.** Most of these cases complain of a pain deep to the sternum (Fig. 32, E). What can be the cause of this pain? There are probably a large number of different causes.

Indigestion, usually due to intestinal worms, causes pain in the upper part of the abdomen and under the lower part of the sternum.

Syphilis of the aorta (Fig. 32, D) may be silent disease apart from pain deep to the sternum. **Pleural adhesions** are common after pneumonia, and may cause pain in various parts of the chest. **Rheumatism,** especially that which is due to gonorrhœa, may attack the large muscles of the chest wall, the breast, and the back. All these diseases are difficult to diagnose and produce little change in the physical signs.

Præcordial pain (Fig. 32, D) is sometimes, but by no means always, due to heart disease. It may also be due to anæmia. It is discussed later.

If a case of pain in the chest presents himself for treatment and the cause of the pain cannot be diagnosed, it is justifiable to try **liniment** and **aspirin.** If the pain persists, refer the case to a doctor.

CIRCULATORY DISEASES

Anæmia.

Definition and Cause.—The blood is red because it contains many **red blood cells,** which float in a watery fluid. If the number of red blood cells become less than normal, then the blood becomes a pale red colour. At the same time the amount of **hæmoglobin**—that is, the colouring material in the red cells—decreases. Anæmia is then said to be present.

There are **many causes** of anæmia. If much blood is lost in any form of **hæmorrhage,** the blood becomes anæmic. Other diseases such as **malaria** and **hookworm** disease destroy the blood silently, and thus cause anæmia. In malaria the parasites live in and destroy the red cells. In hookworm disease the ancylostoma feed on blood. **Bilharzia** also may cause anæmia, because blood is frequently lost in the urine and fæces.

There are other causes of anæmia which cannot easily be explained. Briefly, it can be said that any disease which remains in the body a long time and slowly destroys the strength of the body will cause anæmia. Examples are **syphilis, tuberculosis, yaws,** and **leprosy.** A poor **diet** will cause anæmia.

Symptoms.—Anæmia **starts slowly,** and is such a silent disease that the patients may complain of practically nothing. If the anæmia is severe they may complain of **feeling weak,** and any work makes them tired. They often have severe **pains in the limbs.** Hard work makes them breathe heavily and causes **dyspnœa.** They may feel **giddy** and faint. They may get **headaches.** They may feel the heart beating in the chest—that is, **palpitations** are felt.

Signs.—The pale red colour of the blood is best seen under the **eyelids,** in the **gum, tongue,** inside the **lips** and under the finger-nails.

Treatment.—First try to find the cause. Any cause of hæmorrhage, such as too large monthly periods in a woman or bilharzia, must be cured. The common causes are chronic **malaria** and **hookworm.** The simplest way to decide between these two diseases is to examine for an enlarged spleen. **Often both diseases are present** in the same patient. Œdema is only common in hookworm anæmia.

Almost all forms of anæmia recover if iron is given. Liver may also be required. It is necessary to give iron three times a day for one or two months if it is desired to cure a case of severe anæmia.

Heart Failure.

Definition and Cause.—A large number of different diseases attack the heart, and will in the end make it impossible for the heart to do its work well. It is neither able to pump the blood into the arteries, nor suck it back from the veins. A common disease which attacks the heart is **syphilis.** In **old age** the heart muscle itself becomes weak.

In any case, whatever the cause of heart disease, the only really important question is: **Is heart failure present?** If heart failure is present the blood does not circulate well, and fluid escapes from it to cause œdema of the tissues.

Symptoms.—There are two main symptoms in heart failure. Firstly, the **breathing becomes difficult**—that is, dyspnœa is present. First of all the patient notices this when climbing a hill, then after a few weeks even walking produces dyspnœa. Finally, dyspnœa is present even when the patient is resting.

The second sign is **œdema.** This appears first in the legs, later it extends to the abdomen and causes ascites. The liver is congested; it enlarges and causes pain in the upper part of the abdomen and under the right ribs.

Signs.—If heart failure is severe the patient sits up and breathes deeply and with difficulty all the time. He cannot lie down, for this increases the discomfort of the **dyspnœa.**

The pulse-rate is always increased from 100 to 160, and is proportional to the amount of heart failure. The pulse may be weak, perhaps it is irregular.

The **œdema in the legs** causes a painless swelling. If this is pressed with the tip of the finger, a depression is formed. Both legs are always equally swollen. Pain is not felt until the swelling is fairly extreme.

The ascites and tender enlarged liver can also be noted. A cough is usually present. The sputum may contain blood.

Treatment.—The most important part of the treatment of heart failure is the **resting of the patient in**

bed until the pulse-rate is normal and the dyspnœa has disappeared. Apart from this, medical treatment is useless. Heart failure cases should be examined by a doctor, who will find the disease which is causing the failure. This disease is then treated.

Drugs which help the heart, the chief of which is **digitalis,** may be useful if the patient is resting. But rest, sleep, and small meals are the most important points in the treatment.

Œdema.

Definition and Cause.—Œdema is said to be present when **fluid accumulates in the tissues.** Œdematous tissues are therefore swollen, and they are said to pit on pressure—that is, firm pressure by means of a finger-tip will displace the œdematous fluid, and a pit is seen when the finger has been removed. Œdematous tissues are swollen; they are cold. Pain is due only to distension, and is usually not severe.

The swelling due to œdema has to be distinguished from that of acute inflammation. The latter is a localized process causing swelling in one part; in addition heat, severe pain, and perhaps redness and suppuration occur in acute inflammation, but not in œdema. There are many causes of œdema; the commonest are as follows:

Heart Failure.—Œdema commences in the lowest parts of the body—that is, in both **legs.** It ascends to involve the sacral area at the bottom of the back. Ascites occurs later. There is only slight œdema of the arms or face. The other signs of heart failure are present, such as dyspnœa and a rapid pulse.

Kidney Disease.—Certain varieties of kidney disease produce œdema **all over the body.** In acute nephritis the œdema commences in the **face** and then travels downwards to involve the arms and legs. There may be very much swelling. It is fairly common in young children. There will be no signs of heart failure, and the kidney disease causes much albumen to appear in the urine. In subacute nephritis the distribution of œdema may resemble that of heart failure—that is, it is maximal in the legs.

Anæmia, especially that caused by **hookworm disease,** produces œdema. The œdema is usually only very slight, and the part is said to be puffy. The eyes and feet are puffy. Other signs of anæmia are present, the chief of which is the pale colour of the blood as seen in the conjunctivæ under the eyelids.

Treatment.—It is essential to **ascertain the cause** of the œdema and to treat the cause. Severe œdema should be treated in hospital. Mersalyl injections (2 c.c.) reduce the œdema and should be tried if the kidneys are healthy. They increase the formation of urine.

JAUNDICE.

Definition and Cause.—Bile is formed in the liver. It passes along a small tube into the small intestine. Here it helps the digestion of food, and gives the brown colour to the stool.

Bile is actually made from broken-down red blood cells, a few of which wear out every day. Jaundice means that there is **bile in the blood.** All the parts of the body in which the colour of the blood can be seen —the eyes, gums, etc.—appear yellow in colour. It is seen best in the white parts of the eyes.

Jaundice is really a sign, and is caused by many different diseases. Any disease in which much blood is destroyed, such as malaria, may produce too much bile in the body. Other diseases may close the tube which leads from the liver to the intestines. Then bile cannot escape; it collects in the body, but the stool is pale yellow, like clay in colour.

Symptoms.—There are practically no symptoms produced by jaundice. They are so slight that the patient notices only the symptoms of the disease (malaria, relapsing fever, lobar pneumonia, etc.) which produces the jaundice.

Signs.—The chief sign is the **yellow colour of the eyes.** This may be slight or severe. If severe jaundice is present, bile always escapes in the **urine,** causing it to be a dark greenish-brown colour.

If no bile is escaping in the **stool,** then the fæces are the colour of pale yellow clay.

Treatment.—Treat the cause of the jaundice. The commonest cause is a severe attack of malaria.

Quite often it is impossible for the dresser to find the cause, then the case must be sent to a doctor. If this is impossible, put the patient to bed and give Mist. Mag. Sulph. ½ ounce three times a day.

NERVOUS DISEASES

Epilepsy (Fits).

The cause of epilepsy is not known. The patient seems to be born with a brain of poor quality and usually gets fits all his life.

Symptoms and Signs.—A few seconds before a fit commences the patient has a warning. The **warning** is different in every patient; it may be a strange pain in the abdomen, a strange movement of the arm, or his sight becomes affected. Immediately after the warning the patient becomes completely **unconscious.** In fact, he may burn himself in the fire, and feel nothing until the fit is past. He may hurt himself in his sudden fall. This is the first part of the fit; during it the **muscles** are all tightly **clenched.** It only lasts a few seconds.

During the second part of the fit all the **muscles contract and relax very quickly,** so that the limbs shake very violently. The tongue may be bitten, the urine and fæces may be passed. This part may last about a quarter of an hour.

During the third part of the fit the patient **lies quietly** and the muscles are relaxed. He is still unconscious and can feel no pain. This part lasts about an hour. When, in the end, the patient returns to consciousness, he may have a bad headache, and yet he remembers nothing of the fit.

Some patients do not show the first or second parts of the fit. They only suddenly become unconscious, or perhaps for only a few seconds the eyes may stare but see nothing. These are the lesser fits of epilepsy.

Treatment.—Ignorant people may say that the disease is caused by evil spirits and leave the patient to burn on the fire or drown in a stream. Dressers should know better.

It is extremely **difficult to cure** epilepsy. If **Mist. Pot. Brom.** is taken regularly three times a day the fits become less. It is necessary to continue the medicine for at least a year after the last fit.

During a fit keep the patient quiet. Prevent him from harming himself. Put anything hard, like a spoon covered with a cloth, between his teeth to prevent him biting his tongue.

Convulsions.

Convulsions occur in babies and resemble epilepsy. The brain is poisoned by some disease, and if this disease is cured the convulsions disappear completely. There are many causes of convulsions.

Fevers which produce rigors in an adult produce a convulsion in a child—*e.g.*, malaria and pneumonia.

Intestinal disorders, such as diarrhœa (enteritis) or worms (especially the ascaris worm), often cause convulsions.

Diseases and injuries of the brain—*e.g.*, fractured skull, cerebral malaria and cerebro-spinal fever. The last two should always be remembered if the convulsions are repeated.

Signs.—A convulsion resembles an epileptic fit; the child becomes stiff, shakes, and then lies limp but unconscious. The eyes squint and the face and limbs twitch.

Treatment.—All people fear convulsions, but it is not the convulsion which kills, but the disease which produces the convulsion.

If a child is seen in a convulsion, put him at once into a bath of hot water and apply cold water to the head. The child usually recovers, and should be put to bed. Then give a small **soap and water enema.** When the bowels have been emptied, give 1 drachm of the mixture which contains **Chloral and Potassium Bromide.** The child may be able to swallow it. If still unconscious and swallowing is impossible, give 2 drachms of this mixture in 1 ounce of water by a tube gently into the rectum. This prevents other fits. The mixture can be given by the mouth three times a day for two or three days.

If fever is present, give an intramuscular **injection of quinine,** 1 grain for each year of the baby's age. If later signs appear of cerebro-spinal fever, malaria or any other febrile disease, then the correct treatment must be given.

If no fever is present, and there is no head injury, think of ascaris, or an intestinal disorder like diarrhœa or constipation.

Coma.

If a patient is unconscious, he is said to be in a condition of coma. Coma is therefore a sign of many diseases.

Injuries to the head, skull, and brain.

Diseases of the brain: cerebral malaria, cerebro-spinal fever, epilepsy and convulsions, sleeping sickness, cerebral syphilis, and lunacy.

Poisoning of the brain in anæsthetics, alcohol, and dangerous drugs, such as carbon tetrachloride, oil of chenopodium, and some injections. **Severe illness,** such as pneumonia, typhoid and plague, may poison the brain.

Lack of Blood.—Blood is necessary for the efficient functioning of the brain. Lack of blood in the brain occurs in severe hæmorrhage, in severe anæmias, and in fainting.

Treatment.—Treatment varies according to the cause of the coma, but any comatose patient may be treated along the following lines: Lay the patient flat on a **bed** in a darkened part of the room. Give an enema. **Rectal salines** are useful if the patient cannot swallow. Give an intramuscular **injection of quinine** if fever is present.

Headache.

Pain in the head is one of the commonest symptoms of disease. It tells the patient to rest. Often it may be caused by too much work, too little sleep or food—in fact, things which cannot be called diseases. It occurs in the following conditions:

All fevers, but especially malaria.

All injuries and diseases of the brain, especially cerebro-spinal fever.

Disease or pain near the brain such as coryza, toothache, or poor eyesight if much reading is done.

Any disease which makes the body thin and weak, such as anæmia, chronic syphilis or yaws, tuberculosis, and intestinal worms.

Treatment.—Headache is improved by aspirin and many similar drugs, but these do not cure the cause. Try to find and cure the cause. The commonest cause is malaria.

SKIN DISEASES

Many febrile or infectious diseases affect the skin and produce rashes. Examples are the rashes of smallpox, measles, yaws, and syphilis. These are not really diseases of the skin, but signs in the skin of disease elsewhere in the body. The real diseases of the skin affect only the skin, but not other parts of the body.

Septic Skin Diseases (Impetigo).

These diseases are caused by ordinary bacteria which produce abscesses and inflammation in other parts of the body. They cause very many different diseased conditions to appear in the skin. **Tiny yellow blisters** (pustules) may be seen which contain pus. When they burst, many small and shallow **ulcers** appear. The pus may dry and form a yellow covering, called a crust, which covers the ulcerated area. This crust may be hard if no pus is underneath, or soft because of the presence of pus. The disease is common in children, especially on the face, scalp, and around the genitals and buttocks. It can attack any part of the body.

It is easily cured by hot foments three times a day. Mercury ointments, such as **Ung. Hyd. Nit. Dil.** or **Hyd. Ammon.,** are very effective. The crusts are removed by washing with soap and hot water, then the ointment is applied.

Eczema.

Eczema is due to irritation; it is not caused by bacteria. Some people are easily irritated by one thing and some by another. Young babies have a thin skin which is easily irritated. Beads and wire when worn near to the skin may produce eczema.

Eczema starts with redness of the skin and burning, after which many **very small blisters** (vesicles) occur. They contain a watery fluid. When they burst, the skin may be left covered with many **tiny ulcers.**

Pus-forming germs enter and make the eczema septic.

If eczema lasts a long time, the skin may be left hard and thick, and peels off in small flakes.

At the beginning of an attack **Lotion Calamine** may be applied to the vesicles and ulcerated areas of the skin. Later **Zinc Ointment** should be applied to aid healing. Septic eczema is treated like any other septic skin condition, the antiseptic mercurial ointments being used.

Scabies (Itch) (Fig. 33).

This common disease is due to a small **insect,** or mite, which can just be seen with the naked eye. It **burrows into the skin,** in which it can live and lay its eggs. It attacks thin skin, so that the commonly affected parts are those in **front of the wrists** and **between the fingers.** Almost all parts can be attacked except the palms, soles, face and scalp. The little lines which are the burrows of the insect can be seen only with difficulty, for usually the holes are infected by scratching and change into septic blisters (pustules) and pimples (papules).

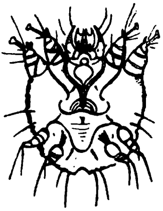


FIG. 33.—THE ITCH MITE. (B.)

Two points aid the diagnosis of this disease. Firstly, it usually attacks certain parts and avoids other parts of the skin; secondly, it **itches** more than any other skin disease.

The disease can be cured in a few days if the following treatment be properly done : The whole body must be **bathed** for a quarter of an hour. Plenty of hot water and soap must be used while the affected parts are rubbed with a nailbrush. This softens the skin and opens up the burrows. The body is dried, and **Sulphur Ointment** is rubbed in for fifteen minutes. Clean clothes are put on and the dirty clothes are washed and boiled. This treatment is repeated on the following day, and as a rule no further treatment is required. Benzyl benzoate emulsion may be painted on to the skin.

Jiggers (Fig. 34).

This small insect enters the skin of the feet or hands. There it swells up with eggs which it discharges through the skin. To remove it, paint a skin antiseptic on the skin, flame a big pin or needle and dig the insect out. The place from which it is dug should be cleaned and covered until healed.

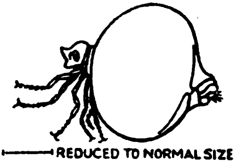


FIG. 34.—THE JIGGER FLEA DISTENDED WITH EGGS. (B.)

Ringworm.

This group of diseases is caused by a peculiar kind of germ. It may attack the scalp, forming many small round white patches, in which the hair will not grow well. It may attack any part of the skin of the body, causing patches of thick skin or skin which is pale in colour. These patches are often round in shape. They have a definite edge where diseased skin meets the healthy skin.

It is extremely difficult to cure ringworm. If it affects the scalp, it is important to shave the scalp once or twice a week and to wash the head thoroughly every day. Paint with Tincture or Liniment of Iodine three times daily until the skin is burnt and peels off. Strong applications should not be used without the advice of the doctor.

FILARIASIS AND ELEPHANTIASIS.

Small parasites, called microfilaria, live in the blood. They may be found in blood films.

Symptoms and Signs.—Most patients who have microfilaria in the blood have no symptoms and no complications. A few may have long-continued and irregular fever.

Treatment.—No drugs exert any effect on this disease.

Elephantiasis.—Many years later a few, but very few, of the patients who suffered from filariasis get a peculiar hard swelling of the skin. This is quite different from œdema because a pit cannot be produced in it by pressure of the finger. The **skin** is very **thick, hard,** and **rough,** like the skin of an elephant.

This disease affects usually two parts of the body, the **legs** and the **scrotum.** Both may swell to an enormous size. Although the patient feels no pain, yet it becomes very difficult to move about. The patient should be sent to hospital for treatment.

Summary.

Asthma.

Cause—Irritation of respiratory organs in a few sensitive persons causes contraction of bronchial tubes.

Symptoms and Signs—Attacks recur at night. Awakes with severe dyspnœa, which lasts a few hours.

Treatment—During attack certain injections give great relief. Difficult to prevent attacks.

Pain in the Chest:

Bronchitis—Pain in front, under sternum.

Lobar pneumonia and pleurisy—Pain in side, increased by coughing and deep breathing.

Indefinite substernal pain of uncertain origin.

Anæmia.

Decrease in the hæmoglobin and in the number of red cells.

Causes—Blood loss: hookworms and malaria. Cachexias: tuberculosis, syphilis, yaws, leprosy.

Symptoms—Tiredness, dyspnœa, palpitations, giddiness.

Signs—Pale conjunctivæ, gums, and tongue.

Treatment—Find and treat the cause. Large doses of iron continued for a long time.

Heart Failure.

Causes—Many and various: syphilis, old age.

Symptoms—Dyspnœa on exertion, œdema of legs, cough.

Signs—Dyspnœa, œdema, rapid pulse.

Treatment—Rest, digitalis in certain cases.

Œdema.

Causes—Heart failure, kidney disease, anæmia.

Epilepsy.

Stages—Preliminary warning.

First stage—Consciousness lost, muscles are contracted and stiff.

Second stage—Limbs and trunk shake.

Third stage—Muscles relax, patient lies quietly.

Treatment—During attack, prevent injuries. Between attacks, Pot. Brom.

Convulsions.

Causes—Fever, intestinal worms, diarrhœa, dysentery, constipation, diseases, and injuries of the brain.

Treatment—Hot bath, enema, rectal Pot. Brom., and Chloral.

Coma.

Causes—Injuries to head, diseases of brain: cerebral malaria, meningitis, epilepsy, sleeping sickness, cerebral syphilis. Poisoning of brain: anæsthetics, alcohol, pneumonia, typhoid. Lack of blood: hæmorrhage, fainting.

Septic Skin Diseases.

Septic pustules, crusts, and small multiple ulcers. Treated by Ung. Hyd. Nit. Dil.

Eczema.

Minute vesicles form—later become septic.

Treatment by Lot. Calam. and, later, Zinc Ointment.

Scabies.

Due to small insect. Causes rash and irritation, especially in front of wrists and between fingers. Treated by Sulphur Ointment.

Jiggers.

Due to insect entering skin.

Ringworm.

Causes circular patches in scalp or on skin.

Treated by painting with Tinct. or Lin. Iodine.

Filariasis.

Microfilaria found in blood films.

Few develop **elephantiasis**—hard thickened skin forms in legs or scrotum.

Questions.

1. What diseases can cause dyspnœa? Why do they do so? How may they be distinguished?
2. Discuss the causes of anæmia. Describe in detail how hookworm anæmia and malarial anæmia are treated.
3. Describe the various stages of an epileptic fit.
4. Describe the changes in the skin in (*a*) impetigo, (*b*) ringworm, (*c*) scabies, (*d*) œdema. (*e*) elephantiasis.
5. Write notes on (*a*) pleural pain, (*b*) hæmoglobin, (*c*) œdema in kidney disease, (*d*) digitalis.

PART IV.—SPECIAL DISEASES

CHAPTER XI

Venereal diseases: Gonorrhœa—Chancroid—Syphilis—Poradenitis. Yaws. *Diseases of the eye:* Conjunctivitis—Blepharitis—Stye—Corneal ulcer. *Diseases of the ear:* Otitis media—Wax.

VENEREAL DISEASES

VENEREAL diseases (V.D.) attack the sexual parts of the body. They therefore spread during sexual intercourse with an infected person. Not every disease which attacks the sexual parts is venereal—that is, they are not all due to sexual intercourse. For instance, pus may form under a tight foreskin of a young baby (balanitis), and yaws may cause sores in all parts of the body, including the genital organs.

Gonorrhœa.

Definition and Cause.—Special germs called gonococci (G.C.) cause gonorrhœa. They attack the wall of the **urethra** and cause acute inflammation. The disease may spread upwards to the bladder and cause **cystitis** (inflammation of the bladder).

In a woman the opening of the **uterus** (the cervix) is affected even more than the vagina. The inflammation may travel through the uterus to attack the two small tubes at the upper end of the uterus which lead from the uterus to the ovaries. The tubes may become inflamed (**salpingitis**).

Gonorrhœa may spread to distant parts of the body. It may be carried in the blood to the joints, where it causes **arthritis** (p. 73). It may be carried on the fingers to the eye, where it causes very severe **conjunctivitis** (p. 196).

Gonorrhœa is spread by **sexual intercourse** with an infected person. Almost everyone gets the disease in this way; perhaps one may get it by such actions as wearing the clothes of an infected person. The germs leave the body only in the urethral or vaginal pus, and they die very soon when they are outside the body, so that it is difficult to understand how anyone gets the disease apart from sexual intercourse. The germs can remain hidden in the urethra many months after the pus has disappeared. This means that it is impossible to say when a person is cured. It also means that the disease can spread easily from a person who thinks he is cured.

Symptoms and Signs in the Male.—About three days after sexual intercourse the man notices that his urine burns when it is passed. He soon starts to notice a thick yellow **discharge of pus** from the end of the urethra. If the inflammation is very severe, he may be unable to pass his urine.

If he is examined at this stage of the illness, the thick discharge is seen. A drop of it may be placed on a slide and sent for a microscopical examination for gonococci.

This thick discharge lasts from two to four weeks and then slowly becomes thin until, in about six or eight weeks' time, a drop may be noticed at the end of the penis only when the patient wakes in the morning.

Symptoms and Signs in the Female.—Gonorrhœa causes inflammation of the short female **urethra** and also of the opening of the uterus. The former causes the urine to burn, and pus will appear at the mouth of the vagina or urethra. The latter causes **pus to be discharged from the vagina.** None of these things are usually noticed by the patient, because these parts are hidden inside the body, and pain is common in these parts at the monthly period, so a little extra pain is not noticed; and, lastly, a discharge of pus from the vagina (leucorrhœa) is a common condition in women, and is not always due to gonorrhœa.

For all these reasons a woman with gonorrhœa often does not know that she has the disease or, if she does, she may be afraid to come for treatment.

Complications in the Male.—1. **Epididymitis**—that is, acute inflammation of the soft part behind the testis—may occur.

2. **An abscess of the prostate gland** forms near the bottom of the bladder. This causes severe pain to be felt above and behind the scrotum, and pain on having the bowels opened.

3. A **stricture** (p. 87) may form years later.

4. **Retention** may occur (p. 89).

Complications in the Female.—1. **Salpingitis,** inflammation and abscess formation in the tubes. The woman complains of very severe pain in the lower part of the abdomen and all the signs of peritonitis are present; fever, a rapid pulse, and tender, hard abdominal muscles.

2. If both tubes are attacked by salpingitis, the woman can never become pregnant again—that is, **sterility** is present. The tubes are closed and remain closed.

Complications in Both Male and Female.—1. **Cystitis** (inflammation of the bladder), causing very frequent and painful micturition.

2. **Arthritis** (p. 73).

3. **Conjunctivitis** (p. 196).

Treatment—Drugs.—Until recently the treatment of gonorrhœa by drugs was very unsatisfactory; mixtures were given containing antiseptic drugs known to be excreted in the urine. At present the most effective form of treatment is to give tablets of sulphathiazole or sulphapyridine by the mouth.

Each of these tablets contains ½ gramme of the drug, and two tablets four times a day should be **given for five days. This course is often sufficient to cure the disease, but it may be necessary to give a second course, as sometimes the disease appears to be cured by the first course, but afterwards returns. A few patients suffer from headache or vomiting after taking the drug, and it is better to give such** patients sulphathiazole, as this is less toxic than sulphapyridine. Patients should drink 6 pints of fluid daily.

Irrigation.—Before the introduction of this drug irrigation was used, and some doctors still use irrigation in combination with the drug.

The principle of irrigation is the application of antiseptics in solution to the urethra. This may do some good if it is practised very carefully three times a day. A doctor should be present to order the correct strength of the fluid, and to see that it is given into the body with the correct force—that is, that the douche-can is at the correct height. As it is almost impossible to do any or all of these things to the ordinary patient, it is probably wiser to leave urethral irrigations alone. However, they are usually employed because unless they are used it is felt that nothing is being done. Potassium Permanganate 1 in 8,000 is commonly used.

If a patient has gonorrhœa, the most important part of the treatment is to make him **drink as much water as possible.** Then much urine is excreted, and the frequent micturition washes away the pus.

Mixtures may be given containing drugs which appear in the urine as antiseptics. They may do some good.

Although it is usually possible to cure one attack of gonorrhœa, yet patients are apt to get reinfected from other persons, and in this case the disease returns and becomes **chronic.**

Chancroid.

Definition and Cause.—This venereal disease is caused by special bacteria which cause ulcers (chancroids) to appear on the genital organs. The bacteria may spread to the glands in the groin, but do not travel any further in the body.

Signs.—About three days after sexual intercourse with an infected person ulcers appear at the end of the penis or on the vulva. **Several small, soft, shallow and painful ulcers** appear. This distinguishes the disease from the large, hard and painless sore or sores (chancre) of primary syphilis.

The ulcers should heal in about three weeks. If this does not occur and one of them is becoming hard, suspect syphilis. The **glands** in the groin enlarge and may suppurate.

Treatment.—Antiseptic lotions and powders are used. The most effective is sulphathiazole taken internally and also applied locally to the ulcers. This results in a speedy cure. Injections of Dmelcos should be given.

Syphilis.

Definition and Cause.—Syphilis is a venereal disease caused by a snake-like form of germ called a **spirochæte.** It enters during sexual intercourse with an infected person and forms a **sore** on the genital organs. Then it slowly **travels all over the body,** and affects the skin, mouth and lymphatic glands. After remaining apparently concealed in the body for many years, it may cause **chronic inflammation** and destruction of any part of the body.

In women it causes **death of the fœtus,** or the child may be born alive but will later develop signs of syphilis. This is called congenital syphilis.

The spirochætes are discharged freely from the sores on the genital organs. Apart from congenital syphilis, syphilis is spread by sexual intercourse.

A few persons such as doctors or dressers may get the disease because they touch syphilitic sores. Then the sore (chancre) appears on the doctor's or dresser's fingers. If the chancre starts on the genital organs it has followed sexual intercourse.

Signs—Primary Stage.—About a **month** after sexual intercourse a **painless sore or sores** (**chancre**) appears on the penis, usually at its end, but it may be anywhere on the penis or scrotum. The sore is about ¼ inch in size and it feels **hard** like a button. If it occurs under the foreskin, this hard button can usually be felt, although much œdema of the whole foreskin has occurred.

In women the primary chancre, as the sore is called, forms on the lips (labia) of the vagina, or at the top of the vagina on the cervix of the uterus. It is hard and single. Many women do not know that it has occurred, or do not report for treatment until the secondary stage.

The primary chancre will heal in about a month even if no treatment is applied, but meanwhile the disease has spread all over the body.

If the chancre does not become septic, the **groin glands** always enlarge slightly; they are comparatively painless and they do not suppurate. The ordinary bacteria of surgical inflammation may enter the chancre and cause sepsis, and spread to the glands, causing suppuration.

During the primary stage the blood test remains negative. At a hospital a **dark-ground microscopic examination** is made of the fluid which exudes from the chancre. This fluid swarms with spirochætes.

Secondary Stage.—About one or two months after the primary chancre appears the **blood test becomes positive,** for the spirochætes are **spreading in the blood all over the body.** As soon as this occurs the secondary stage commences, and it lasts from three months to two years.

Condylomata appear around the anus, the scrotum, or the lips of the vagina. They are about the size of a small pea or bean and are grey or white in colour, and stand up above the surrounding skin. Often they are the only signs of secondary syphilis, and in women they are usually the first thing which is noticed. They are very infectious, but they are not painful. They are the chief cause of the spread of the disease during sexual intercourse.

During the secondary stage the whole of the skin is affected by a **rash.** The condylomata and the sores at the corner of the mouth are simply the rash which has become swollen with moisture which is present in these parts of the body. The rash is seen best on the back and the front of the **chest and abdomen.** It may also affect the arms and the legs. It is equal on both sides of the body. It **never itches.** The spots of the rash are many **different shapes and sizes.** In some places small spots of dark skin are seen, in other places there are papules—that is, slight swellings can be felt and seen. In many patients nothing at all can be seen, for the dark skin hides the change. Ulceration of the skin and pus formation and blisters (vesicles) are very rare. If the rash is severe, condylomata will almost certainly be present and the scar of a healed primary chancre may be seen, and certainly the glands in the groin will still be swollen. A diagnosis of secondary syphilis should never be made on the rash alone, since in native patients it is never very obvious. The usual mistake is to think other skin diseases are syphilis.

Sore throat may be present, because ulcers form near the tonsils. They are covered by a greyish-white membrane.

All the **lymphatic glands** in the body may enlarge slightly. This is felt best in the glands at the back of the neck and in the inguinal region. Irregular fever may be present in a few cases, but patients do not usually complain of fever or rigors. Some aching pains may be felt in the bones, but a diagnosis of syphilis should never be made on this symptom only, since the commonest cause of pain in the limbs is any fever or cachexia, especially malaria. If a woman becomes pregnant in the secondary stage she will almost certainly have a **miscarriage.** If she gets medicine and injections every week, she may produce a healthy child.

Tertiary Stage.—The secondary stage usually slowly cures itself, and some patients never develop any further signs. Unless the treatment has been very thorough, spirochætes remain hidden in a few parts of the body, and then cause chronic inflammation to appear from three to thirty years later.

A lump of chronic inflammation called a gumma slowly appears. It is felt as a lump of fairly hard tissue which has no definite edge like a tumour. If it appears near the surface of the body, the skin slowly breaks down and a **deep ulcer** results. This ulcer is deep, the walls run straight down, and at the bottom is a yellow slough. It refuses to heal until the patient is treated for syphilis.

Gummata appear commonly in the skin, in the subcutaneous tissues and in the bones, especially the tibia and the roof of the mouth. In the skin hard lumps of thickened skin form in a bunch; they ulcerate; then one part heals, leaving a thin pale skin, while other ulcers appear at the edge. It is difficult to describe this appearance; it may be compared to small round clouds (the ulcers) which have almost joined to form one big cloud, but some sky is still showing in the middle—the healed pale skin. Gummata of the skin of the palm and soles and lips produce areas of pale skin.

If gummata form under the skin, deep steep-walled ulcers appear. In the mouth an ulcer may destroy the roof of the palate or the back of the throat. In bones large hard lumps of swollen bone appear, and perhaps deep ulcers and sinuses.

Gummata also commonly form in the internal organs, and cause signs that this organ is not working well. Usually no swelling is seen; it can only be discovered at post-mortem. It commonly attacks the **heart,** causing heart failure, and the **spinal cord** and **brain,** causing paralysis and insanity.

Congenital Syphilis.—A woman with secondary syphilis usually has a miscarriage if she becomes pregnant. **Miscarriage follows miscarriage,** but usually each time it occurs rather later in pregnancy, until in the end, as the disease becomes less severe, a child is born, who dies in a few weeks of **congenital syphilis.** Next time a child may be born apparently healthy, but in a few weeks shows signs of the disease. Later on, as the mother recovers, a perfectly healthy child is born.

Congenital syphilis is **never a common disease.** The early pregnancies produce miscarriages, the later pregnancies produce healthy children. Only the middle pregnancies produce congenital syphilis. Many people confuse yaws and congenital syphilis.

The signs of congenital syphilis are very many, and almost all the signs can be produced by other diseases, so the **diagnosis is very difficult.** Condylomata and a sore at the corner of the mouth are two signs not produced by other diseases. Bony lumps on the skull or swelling of the end of a bone (epiphysitis) are also almost certain signs of congenital syphilis. A snuffling of the nose, skin rashes, enlargement of the liver and spleen can occur in congenital syphilis and many other diseases. Almost all congenital syphilitic babies are very thin and anæmic.

Many cases of congenital syphilis die even if a full course of injections is given. To cure the disease the child should receive treatment every week for one or two years. One or two injections will not cure congenital syphilis, although it may cause yaws to disappear.

Treatment.—Four drugs are very useful in the treatment of syphilis—N.A.B., Bismuth, Mercury, and Potassium Iodide. The first two are also useful in yaws.

N.A.B. is a light yellow powder contained in small glass bottles (ampoules). If the ampoule is cracked or the powder has changed in colour, do not give the N.A.B., as it is poisonous. Each ampoule contains 0·3 or 0·6 or 0·9 gramme (not grains). Adults should receive a course of six injections, commencing at 0·3 gramme and increasing to 0·9 gramme in men and 0·75 gramme in women. After a course of injections the patient should rest a month, and then receive another course. This should be repeated until the blood test is negative, and often four or six courses are required. N.A.B. cannot be given into the muscles or under the skin because it causes great irritation. Other very similar drugs can be so given. They are often called M.A.B., and are used for the treatment of children.

Bismuth is given as an intramuscular injection into the buttock. There are many different preparations, and the usual dose is 2 c.c. for an adult given weekly up to twelve injections. It may cause stomatitis (p. 142).

Mercury was very largely used in the treatment of syphilis before N.A.B. and Bismuth were discovered. In Africans many doctors report that mercury easily produces stomatitis. It can be given in many different ways, either by a mixture, by tablets, or by an injection. It can be given as an ointment rubbed into the skin, and is used in this way in the treatment of children with congenital syphilis.

Potassium Iodide is used as a mixture between the courses of N.A.B. It is extremely valuable in helping gummata to disappear.

A case of syphilis should **continue under treatment until the blood test is negative;** this usually requires at least four, five, or six courses of injections, perhaps more. Only in this way can the fatal tertiary results be avoided, which, if they appear, cannot be often cured even by a large number of injections.

Native patients seldom agree to remain under treatment for a long time. As soon as pain is lost and the sores have healed they depart. Every effort should be made to persuade them to attend regularly.

Poradenitis.

Definition and Cause.—This is a special form of adenitis of the lymphatic glands which receive lymph from the genital organs. The germ is a **virus** which enters the skin through small wounds infected during sexual intercourse. It is therefore a venereal disease, and it is exceedingly common in some parts of tropical Africa.

Symptoms and Signs.—There is always a **primary** sore, but it is so small that the patient seldom notices it, and it heals quickly. Later a bubo forms in the groin; it is swollen and very painful. The skin over the infected glands becomes hard, red, and tender. Later the glands suppurate and pus comes through the skin; the wound does not heal, but ulcerates and spreads until a large **irregular ulcer** forms, which will not heal for many months. When it heals it leaves a puckered scar in the groin. This condition is well known, and occurs in males and females alike.

In the female, however, ulceration occurs also in the vagina and rectum, leading to destruction of the vaginal wall and **stricture in the rectum.** Then there are several conditions arising from the same cause, and instead of speaking of each as a separate disease, all are grouped into one and named poradenitis.

Treatment.—In the early stage of the bubo the disease can be cured and ulceration prevented. When ulceration has taken place the disease can be cured, but it takes a very long time. Treatment should not be attempted in a dispensary, for there is only one kind of treatment that is of any use, and it must be given by a doctor. The virus can be killed by producing a series of high temperatures in the patient. This is done by giving protein shocks, **T.A.B. Vaccine** 0·1 c.c. intravenously, and as several shocks are required, the patient should be kept in hospital. If treated early, a great deal of pain and trouble can be avoided, so there should be no delay in sending the patient to the hospital.

YAWS

Definition and Cause.—Yaws is an infectious disease, but not a venereal disease. Its **germ resembles very much that of syphilis,** and in many ways the diseases are very similar. In fact, some of the results of tertiary yaws cannot be distinguished from the tertiary results of syphilis; others can. The primary and secondary stages of yaws are, in the opinion of most doctors, quite different from those of syphilis.

The Primary Yaw.—The primary yaw, as the first sore is called, appears on **any part of the body except the genital organs.** It is commonest on the leg. It resembles one of the sores of the secondary stage, and lasts about a month; then it starts to heal without any medicine being applied.

Secondary Yaws.—About the time that the primary yaw is healing, other sores appear on **all parts of the skin of the body.** They are common in those parts of the body which are moist, such as round the anus and genital organs, under the armpits and by the corner of the mouth. They measure from ¼ inch in size. If they are not covered by a yellow crust, the reddish-blue dotted surface can be seen. They stand out **above** the surface of the skin, and so are not really ulcers.

If not treated, successive crops of secondary sores appear during a period of from three to twelve months.

Tertiary Yaws.—Even when the secondary sores have healed, the disease can remain in the skin and bones to cause tertiary disease. This may appear from three to thirty years later.

In the skin lumps like gummata and **deep ulcers** appear. In the sole of the foot painful pieces of flesh may push up through the skin (**crab yaws**) or deep cracks may form. The same changes occur on the palm. **The back of the hand and palm** may become white in patches, or its skin may become thin and shiny. Fingers and toes may be twisted and be lost.

Painful lumps of hard chronic inflammation may appear on the surface of the bones (**periostitis**). They are very common on the tibiæ. A large ulcer may form in the roof of the mouth and destroy the nose (**gangosa**). Yaws never produces disease of the internal organs in the abdomen, chest or brain. It never produces miscarriages in pregnancy, and it is never passed to the babies to produce a congenital disease. In all these respects yaws is very different from syphilis.

Treatment.—Yaws is treated by **N.A.B.** and **Bismuth.** It is more easily controlled than syphilis, and probably six injections are enough. Even after one or two injections the sores heal, but at least six injections are needed to prevent the tertiary signs from appearing. Bismuth should be used whenever possible because it is so much cheaper than N.A.B.

EYE DISEASES

Conjunctivitis.

Three kinds will be described—simple conjunctivitis, gonorrhœal and trachoma.

Conjunctivitis (the Simple Variety).—This disease is spread by **flies** and by **dust.** The eyes become **red and painful.** They discharge pus. The disease starts suddenly, and is usually cured in a week or two.

Treat it by washing out the eyes three times a day with Boric Lotion, which may contain some Zinc Sulphate. Protargol drops may then be dropped into the eyes. Shade the eyes from the light.

Gonorrhœal Conjunctivitis.—This may appear in **adults** who suffer from the disease, the infection having been carried by the patient's fingers. It may occur in **young babies,** whose eyes are infected during birth from a mother who has suffered from gonorrhœa. Then it appears towards the end of the first week of life.

It produces very **severe conjunctivitis.** The eyelids swell and much pus is discharged. Young babies may have their eyes completely destroyed.

Treat the patient, as in simple conjunctivitis, by frequent bathing with Boric Lotion and Protargol. It may be applied every two or three hours. The sulphonamides, given internally, soon cure this disease.

Trachoma.—Trachoma is an **infectious chronic disease** of the conjunctiva. After lasting many months or years, it often causes blindness. In certain parts of Africa it is so common that almost everyone contracts trachoma.

The eyes slowly become painful. The eyelids contain small white pimples (**follicles**) which stand up above the red conjunctiva. They are about the size of a pin's head. After a time a white film grows over the front of the eye, producing permanent blindness. It is a very difficult disease to cure. Cases should be sent to hospital. Bathing the eyes with **Perchloride Lotion** and applying **Silver Nitrate** may do some good.

Blepharitis.

Blepharitis means inflammation of the **eyelids.** Their edges become red and are covered by yellow crusts. It can be treated by bathing the eyes and rubbing **Ung. Hyd. Ox. Flav.** on the edges of the lids.

Stye.

A boil of the hairs of the eyelids is called a stye. It resembles other boils, but is smaller. It is treated by hot fomentations.

Corneal Ulcer.

This is not a very common disease. A small inflammatory ulcer appears on the cornea—that is, the front of the eye, which appears like glass. When it commences it is very small, like a tiny **scratch.** It can be seen only by looking at the eye in every direction until the scratch is seen. **Great pain** is always present, and the patient **cannot bear any light** in his eyes.

These two points should always suggest a corneal ulcer. The whole eye is red, but this is most marked in a ring round the edge of the cornea. The case should be sent at once to hospital.

DISEASES OF THE EAR

Otitis Media.

Definition and Cause.—The ear consists of three parts (Fig. 35)—an **outer** tube with a **drum** at the bottom to collect the sound, a small **middle part** to carry the sound to the **inner part,** which contains the nerves. The middle part is shut off from the air by the drum, but the Eustachian tube leads to the throat ("Anatomy and Physiology," p. 30). In coughs, colds and tonsillitis infections can travel up this tube to form a small abscess in the middle ear. This is common in children.

Symptoms and Signs.—The disease starts suddenly with severe **pain** in the ear. After two or three days the **pus bursts through the drum** and is seen in the outer ear; then the pain ceases.

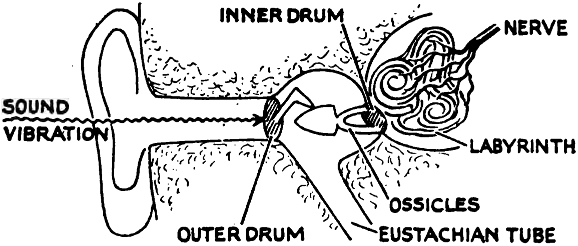


FIG. 35.—DIAGRAM OF THE EAR. (B.)

Treatment.—Clean out the pus with dry cotton-wool swabs. Syringing is usually bad, and if ordered must be performed gently.

Antiseptic ear drops are placed in the outer ear and a small pad of cotton-wool is placed lightly in the ear. This should be repeated three times a day, and then the discharge usually ceases in a week or two.

If the discharge continues for a long time, the patient should be sent to hospital, where an operation may be found to be necessary.

Wax.

Cause.—The outer ear makes a sticky kind of sweat which forms wax.

Symptoms.—The patient may feel the irritation in his ear, but usually he feels nothing until slowly or suddenly he becomes **deaf.**

He can always just hear a watch ticking when held on the bone behind the ear, better even than when it is placed outside the ear. This occurs only when the deafness is due to wax.

Treatment.—The ears should be **syringed** with water which is just as warm as the body.

Summary.

Venereal Diseases:

Gonorrhœa.—*Cause*—Gonococci, transmitted by sexual intercourse.

Male—Painful micturition, urethral discharge, retention of urine.

Female—Symptoms often overlooked; leucorrhœa.

Complications—Male : epididymitis, abscess of the prostate, stricture a late result.

Female—Salpingitis, sterility.

Both Sexes—Cystitis, arthritis, conjunctivitis

Treatment—Sulphonamides, irrigations.

Chancroids.—*Cause*—Special bacteria transmitted by sexual intercourse. **Multiple small** superficial, septic, painful **ulcers** on the genitals. **Glands** often suppurate.

Treatment—Antiseptic powders, sulphonamides.

Syphilis.—*Cause*—A spirochæte, transmitted often by sexual intercourse, possibly by innocent contact, or from mother to the fœtus (congenital syphilis).

Primary—Chancre, hard, painless, single, lasts two to four weeks.

Secondary—Blood test becomes positive, inguinal adenitis and generalized adenitis, rashes, condylomata.

Tertiary—Chronic inflammatory diseases—gumma of skin and bones, syphilitic disease of heart and nervous system.

Pregnancy.—Abortion common in first five years .of infection.

Congenital Syphilis.—Child infected from mother, many signs: wasting, condylomata, etc.

Treatment—N.A.B., Bismuth, Iodides, Mercury, continued for probably one to two years to produce a cure.

Poradenitis.—A virus infection due to sexual intercourse.

Primary genital sore heals in few days; not noticed.

Male—Inguinal glands slowly enlarge, suppurate, and sinus is slow to heal.

Female—Destruction and stricture of rectum and vagina.

Treatment—Protein shock by T.A.B. vaccine.

Yaws.

Not a venereal disease. Contracted usually in childhood by flies contaminating scratches on the legs.

Primary—One sore forms, usually on legs.

Secondary—Many sores form, especially in areas exposed to moisture: mouth, armpit, groin.

Tertiary—Chronic inflammation of bones, joints, and skin. Never affects internal organs or produces abortion.

Treatment—Resembles that of syphilis.

Eye Diseases :

Conjunctivitis.—*Simple*—Due to dust and flies; treated by lotions irrigating the eye.

Gonococcal—Due to gonorrhœa; serious and suppurative conjunctivitis requires thorough treatment by the sulphonamides.

Trachoma.—A chronic and infectious variety; resists treatment.

Blepharitis.—Inflammation of edge of eyelids; treated by Ung. Hyd. Ox. Flav.

Corneal Ulcer.—Small ulcer on cornea, great pain, cannot bear light in the eye.

Ear Diseases:

Wax.—Causes deafness; treated by syringing.

Otitis Media.—Causes pain and discharge; treated by antiseptics to outer ear.

Questions.

1. How do gonococci spread to the following parts: (*a*) conjunctiva, (*b*) Fallopian tube, (*c*) bladder, (*d*) joints, (*e*) prostate, (*f*) epididymis ?
2. How may the penile sores of the following diseases be distinguished: (*a*) Syphilis, (*b*) chancroid, (*c*) poradenitis ?
3. What are the signs of secondary syphilis ?
4. How may syphilis affect the pregnant mother and the fœtus ?
5. In what respects do yaws and syphilis resemble one another, and in what respects do they differ ?
6. Write notes on (*a*) trachoma, (*b*) a discharging ear, (*c*) deafness, (*d*) blepharitis.

CHAPTER XII

DIETS AND MALNUTRITION

The Need of an Adequate Diet.—Diet plays a very important part in the treatment of disease and at the same time it plays a very important part in the production of disease. This is especially true in the tropics, where the majority of persons are poorly fed. The diseases which are produced in this manner are called the deficiency diseases because there is a shortage of a certain substance or substances in the body—that is, there is a deficiency.

These deficiencies can act in several different ways and may arise in various manners. Thus certain shortages in the patient's diet before his admission to hospital may have produced deficiency disease in his body; this will be cured by adding these substances to his diet after his admission. On the other hand, the deficiency disease may have weakened his resistance so much that he has contracted some infection like pneumonia, and it is the latter condition which brings him to hospital. This is actually the commonest state of affairs in the hospitals of tropical Africa, and often only the infective condition is diagnosed and treated; the important malnutrition may not be noticed and may never be treated. Again, the patient may be well nourished when he is admitted to hospital, but he may have contracted a serious illness like typhoid, and this may result in a serious reduction of food for some weeks, so that the patient may suffer from malnutrition, and much of the weakness during the convalescence is due to this cause. This has resulted in the allowance of more food to cases of typhoid than was formerly the custom.

The Requirements of the Body.—An adult man requires the following amounts of food:

Calories—2,500 if doing no work, 3,000 if doing work.
Protein—70 grams, of which one-fifth should be of animal origin.
Carbohydrates and fat to produce the required number of calories.
Calcium—0·8 grams (800 milligrams).
Iron—12 milligrams.
Vitamin A—5,000 units.
Vitamin B_1—500 to 700 units (1·5 to 1·8 milligrams).
Vitamin nicotinic acid—15 to 18 milligrams.
Vitamin C—50 to 75 milligrams.
Vitamin D—500 units, much of which can be obtained by direct exposure to sunlight. Young children need the same amounts.

Children need less, but they need more than their weights might suggest. Thus a baby of one year requires nearly half the amount of protein that is taken by an adult man. Women need slightly less than men, but it should be remembered that in many parts of Africa they may perform more hard manual work than the men; in this case they will require more of all articles of food. In addition their needs in pregnancy and during lactation are enormously increased, as they have to take enough food for themselves and their babies.

When the body does not receive enough food, then it becomes weak; it cannot perform hard muscular work either well or speedily, and it contracts easily any infectious disease that is travelling round. Fatigue occurs easily and mental exertion is avoided. At this stage no doctor can detect by means of an ordinary examination that there is malnutrition present, and unfortunately this is the state of the majority of the inhabitants of the tropics. In them it is extremely difficult to detect the results of malnutrition, and many doctors have doubted if they are suffering from deficiency disease. This could only be proved by giving them a much better diet for several months and seeing if they work any faster and fatigue less easily. The results of this mild chronic malnutrition results in many babies dying of infectious diseases; others survive but grow very slowly, their weight is always far below that of a well-fed child, they never grow to a good tall height or are well developed, they are unable to perform easily hard muscular work, they tend to be lazy.

If the diet is extermely poor, one of the definite deficiency diseases may occur, but this is only the result of a severe and prolonged deficiency.

There are, of course, many slight variations in the different varieties of food from various parts of the country, but the figures opposite represent a fair average. There are also considerable variations in the composition of the food according to the method of preparation. Thus brown bread contains 24 units of vitamin B_1 compared to 6 units in the white variety. Similarly, polished rice contains only 3 units of vitamin B_1, whereas the unpolished variety contains 30 units.

To use the table (p. 205) proceed as follows. Ascertain the amount of food that is issued to the kitchen each day, and deduct the amount wasted in the preparation of the food. This gives the amount that is put in the cooking pot. Cooking, however, destroys much of the vitamin C, roughly one-third of which is destroyed each hour of the cooking. About one-fifth of the vitamin B_1 and of the nicotinic acid is similarly destroyed each hour. These amounts must be deducted, and thus the final amount taken by the patient is ascertained.

The Composition of Some Common Tropical Foods.

The amount present in 1 ounce of prepared food:

Food	*Waste*	*P*	*F*	*C*	*Ca*	*Ir*	*A*	*B*	*N*	*C*	*D*	*Calories*
Proteins:	%											
Beans ..	—	7·0	0·6	12·0	15·0	2·0	40	30	0·2	0	0	83
Beans, soya	—	11·0	5·1	7·0	70·0	3·1	45	55	1·4	0	0	119
Beef ..	20	5·8	2·1	0	2·0	1·0	14	13	1·5	0	0	43
Egg	12	3·7	3·1	0	16·0	0·7	110	14	0·6	0	18	46
Liver ..	—	4·7	2·3	0	2·0	3·9	4,500	25	5·1	13	0	41
Nuts ..	30	8·0	13·9	2·4	17·0	0·6	3	60	3·7	3	0	171
Fish ..	30	5·1	0·3	0	6·0	0·2	0	7	0·6	0	30	22
Fats and milk:												
Milk ..	—	0·9	1·7	1·3	82·0	0·1	150	8	0·1	0	3	24
Palm oil ..	—	0	28·4	0	0	0	3,000	0	0	0	0	264
Vegetable oil	—	0	28·4	0	0	0	0	0	0	0	0	264
Carbohydrates:												
Bread ..	—	2·2	0·2	15·0	7·0	0·3	0	6	0·2	0	0	74
Cassava ..	—	0·2	0	8·6	11·0	0	0	0	0	9	0	35
Flour ..	—	3·0	0·3	22·7	5·0	0·3	0	8	0·2	0	0	108
Maize ..	—	3·0	1·4	21·0	2·0	1·0	0	9	0·2	0	0	93
Millet ..	—	1·8	0·5	21·0	10·0	0·1	8	15	0·6	0	0	95
Plantains ..	50	0·4	0	6·0	1·3	0·1	50	3	0·11	4	0	26
Potato ..	33	0·3	0·1	7·5	4·0	0	0	4	0·1	7	0	32
Rice ..	—	1·9	0·3	25·0	1·0	0·1	0	3	0·6	0	0	103
Sugar ..	—	0	0	28·0	0	0	0	0	0	0	0	116
Vegetables, fruits:												
Green leaves	20	0·3	0	0·5	25·0	0·3	400	8	0	10	0	10
Carrots ..	12	0·2	0	1·5	14·0	0·2	400	5	0·1	1	0	6
Guava ..	15	0·2	0	2·4	12·0	0·2	14	14	0	41	0	10
Lemon ..	33	0·2	0	0·9	30·0	0·1	0	3	0	8	0	4
Mango ..	33	0·3	0	4·1	2·0	0·2	360	6	0	12	0	18
Orange ..	25	0·2	0	2·4	12·0	0·1	18	4	0	13	0	11
Pawpaw ..	25	0·6	0	2·2	0	0	900	3	0	13	0	11
Peas ..	60	1·6	0	3·0	4·0	0·5	60	45	0	8	0	19
Tomato ..	—	0·3	0	0·8	4·0	0·1	280	7	0·1	6	0	4

P=protein in grams. *F*=fat in grams. *C*=carbohydrate in grams. *Ca*=calcium in milligrams. *Ir*=iron in milligrams. *A*=vitamin A in international units. *B*=vitamin B_1 in international units. *N*=vitamin nicotinic acid in milligrams. *C*=vitamin C in milligrams. *D*=vitamin D in international units. *Calories*=calories present in 1 ounce of prepared food, after deducting the wastage lost in its preparation.

In actual practice it is seldom possible to calculate the exact composition of any particular diet, but as it principally consists of a few articles, the important thing is to calculate the contents of the main three or four articles—that is, the staple articles of diet. From this it can be seen what are the main deficiencies that are likely to occur.

In disease the body requires just the same amounts of food as in health. During a short fever which only lasts a few days it matters little that the patient takes but little food; his main need is for sufficient fluid to drink. About 6 pints of fluid are required each day by a febrile patient, and in seriously ill persons it is necessary to keep a fluid chart, which gives the volumes of the different feeds, and the volume of the urine output. If the latter falls below 40 ounces in the 24 hours it is necessary to increase the amounts of fluid drunk, or if the patient is vomiting, then intravenous salines are required. The need of fluid is much increased in diarrhœa and in dysentery in which much fluid is lost from the body, and patients tend to become dehydrated (dry). Extra amounts of fluid are required in all conditions of shock, for then the blood volume is reduced in amount and fluids tend to restore this volume to the normal level.

MULTIPLE DEFICIENCY DISEASE

General Malnutrition.

The diet of most poor persons in the tropics is deficient in many respects. Firstly, it is usually deficient in calories unless the person lives in a fertile part of the country or is fairly wealthy and can buy enough food. If only two meals are taken in the day then, unless they each contain 1,500 calories, the total number of calories taken each day is deficient. It is extremely difficult for any adult to take 1,500 calories in a meal unless large amounts of fat are taken, but African diets are usually deficient in fat, some 30 to 50 grams of which should probably be taken each day.

At the same time there is usually a deficiency of protein, especially if the staple articles of the diet are vegetables such as plantains, potatoes, or yams, or cassava, most of which contain only 0·1 to 0·3 per cent. of protein, and compare unfavourably with the cereals such as maize, wheat, or rice, which contain 2·0 to 3·0 per cent. of protein.

If the diet is deficient in protein and in calories, then the blood proteins fall until, when a certain figure is reached, then œdema occurs. This is specially apt to occur if there are parasites in the body, such as hookworms which suck blood, containing protein, in the small intestine. Thus hookworm disease is usually accompanied by œdema in poorly fed persons. The œdema due to protein deficiency is called nutritional œdema; it is very common in a large number of different diseases in the tropics.

At the same time these diets are usually deficient in the vitamin B group, both vitamin B_1 and also nicotinic acid. There may also be a deficiency of vitamin C, depending on whether the staple articles of diet are rich in this vitamin, as is the case with potatoes, plantains, and yams; or deficient in it, as is the case with any cereal such as maize, rice, or millet. In this way there results the multiple deficiency disease as it is seen in many of the inhabitants of the tropics.

This is first seen in young babies after the fifth month, but seldom before this, for the child has usually been adequately fed on the mother's breast milk. These babies fail to gain the correct amount of weight; the hair becomes brown and soft, and at the same time the skin becomes pale and brownish in colour. Attacks of diarrhœa are verv common, and pneumonia is easily contracted. Attacks of malaria are frequent, and during these attacks the baby tends to take but little food.

In adults this disease usually only occurs in times of food shortage and in districts where the crops are short. Patients develop œdema, they become very thin, the hair becomes soft and brownish, the skin in front of the shins cracks, and this is called mosaic skin. Patients also complain of pains in their limbs. They often get attacks of diarrhœa.

This disease is treated by giving a diet rich in calories; at least 3,000 should be taken as small frequent feeds. Extra amounts of protein are required—over 100 grams a day should be given—and as much of this as possible should be of animal origin. Increased amounts of the vitamin B group are required, but these are usually contained in this liberal diet. Vitamin B_1 may be given if the limb pains are severe or the appetite is very poor. Nicotinic acid may be required for the skin condition and for the attacks of diarrhœa. Liver is a useful supplement to the diet.

Deficiency of Calcium.

It is not only important to see that the diet contains enough calcium; what is equally important is the amount of vitamin D present in the body, for this controls the amount of calcium that is absorbed from the intestines. Most of the vitamin D is made in the skin by the action of the sunlight, and there is seldom any deficiency of this vitamin in the tropics. Perhaps this may explain why many Africans appear to keep very well on but small amounts of calcium in the diet.

If the amount of calcium absorbed is not adequate, the bones and teeth are not well formed. The bones may start to soften, and the teeth are apt to develop cavities where caries (decay) has attacked the teeth.

Deficiency of Iron.

Iron is required to make the hæmoglobin in the red cells of the blood. A certain number of new red cells are made each day, for a certain number are destroyed, so that if there were no new cells made the person would become anæmic. This occurs in iron deficiency, as an inadequate number of red cells are made each day. In certain conditions there may be an increased demand for iron; this occurs during pregnancy, when iron is being passed to the fœtus. Again, if blood, and so iron in the hæmoglobin, is lost from the body, then more iron will be required. This occurs in the menstruation of women and in hookworm disease. In both of these conditions more iron is required, and if it is not forthcoming then iron deficiency anæmia results. In this anæmia there is a low colour index of, say, 0·6, in the blood count report. The anæmia is cured by giving extra amounts of iron for a few weeks.

Deficiency of Vitamin A.

This vitamin, or a rather similar substance, is found in all green leaves and in all orange and yellow-coloured fruits. It is also present in yellow oils, like red palm oil, and in the yellow fat and cream of milk, and so it is also present in butter.

When there is a deficiency of it present in the body the person cannot see well at night, for small amounts of this vitamin are required by the eye. Night-blindness results.

At the same time the eye becomes unduly dry as the tear glands do not function normally. The eye becomes dry (xerophthalmia), and in time ulceration of the cornea may result.

The skin also tends to develop small hard papules around the hair follicles, and these are seen on the elbows and the knees (phrynoderma).

These conditions are treated by increasing the amount of vitamin A in the diet, but to begin with some supplement like red palm oil will be added as it is very rich in this vitamin.

Deficiency of Vitamin B_1.

This vitamin is present in small amounts in the outer layer of most grains, and it is usually largely removed in the grinding and the milling of the grain. Thus unpolished rice contains much more than polished rice, and wholemeal flour and bread contains more than white flour and white bread. Whether there is a deficiency of this vitamin will depend almost entirely on whether the staple articles of the diet are rich in this vitamin.

Vitamin B_1 is required by all the cells of the body in order that they can use the sugar that is supplied to them from the carbohydrates of the food. Small amounts of this vitamin are required in order to allow the sugar to be destroyed and thus release its energy If this does not occur then poisonous products are produced which injure the cells of the body.

The disease of beri-beri results. Fortunately, this disease is not common in Africa, but it is very frequent in the East, where much polished rice is taken. Minor degrees of vitamin B_1 deficiency are very common, especially after long-continued fevers in which the vitamin is required in large amounts, but the diet during the illness may have contained but little. This results in loss of appetite and sometimes in neuritis.

Beri-beri shows itself as heart failure of the usual congestive type. This responds very well to the administration of the pure vitamin by tablets or by an injection; 50 to 100 milligrams may be required during the first few days. Beri-beri may also show itself as neuritis; in this the nerves of the limbs become useless, the limbs become weak and lose the sensations of the skin.

Deficiency of Nicotinic Acid.

This vitamin is found in most flesh foods, but is only very scantily present in all cereals and in all vegetable sources of food. Maize is especially poor in this vitamin, and the disease of pellagra is only common among persons who eat maize as their staple article of diet.

Pellagra is, however, due to a deficiency of several things in the diet—that is, it is a multiple deficiency disease. It is not just due to a deficiency of nicotinic acid. Actually this is true of most of the deficiency diseases; thus beri-beri is probably not simply a deficiency of vitamin B_1.

Nicotinic acid is required by all the cells of the body and enables them to breathe and to use the oxygen. When the body is short of this vitamin a dermatosis occurs on the parts of the skin that are exposed to sunlight or to pressure and to irritation. Thus in Africans the skin in front of the shins becomes rough and scaley (mosaic skin). Sore mouth from stomatitis, and attacks of diarrhœa are apt to occur. In time, if the deficiency is continued, insanity may occur.

Pellagra is treated by giving a liberal diet, containing much milk, meat, or liver. In addition, the pure nicotinic acid may be given in a dose of 200 to 500 milligrams daily.

Deficiency of Vitamin C.

Vitamin C is found in fair amounts in all fresh vegetables and in fresh fruits; only very small amounts are found in the grains and in animal products. The vitamin is fairly rapidly reduced by storing the fruit or vegetable, and it is reduced by cooking. Persons who rely on a vegetable for their staple article of diet, such as the plantain or the potato or the yam, receive large amounts of this vitamin in spite of the cooking. They almost never suffer from the deficiency of this vitamin which results in the disease of scurvy. On the other hand, those who rely on a cereal are always very short of the vitamin; they must take fruit or vegetables, preferably uncooked, or they will contract the disease.

Vitamin C is required in order to keep the substance that lies between all the cells of the body in a healthy condition. If there is a deficiency of this vitamin, then bleeding is apt to occur anywhere in the body. In adults there is often much bleeding from the tooth sockets. In time the teeth loosen and fall out. Anæmia results. The patient becomes weak and in time dies.

Treatment is affected by giving fresh uncooked fruit or vegetables. The pure vitamin, ascorbic acid, may be given—100 to 300 milligrams a day.

Deficiency of Vitamin D.

Vitamin D is formed in the bare skin of the human being when it is exposed to direct sunlight. In this way the normal adult or the child forms the large majority of the vitamin D that is required by the body. This is especially true in the tropics where people wear little in the way of clothes and the children run bare-skinned in the sun. In the colder parts of the world persons must rely on receiving most of their vitamin D in their food. This is especially true of babies in the temperate regions of the world. There the children rely on the amount of vitamin contained in butter, milk, eggs, or on products like cod-liver oil, which are very rich in this vitamin.

Vitamin D helps the absorption of calcium from the intestines. It thus aids the formation of the teeth and the bones. When there is a deficiency of this vitamin, the bones are too soft and they tend to bend in the young child. The teeth are not well formed and soon decay to form cavities (dental caries).

The disease thus formed is spoken of as rickets. Although very common among the poorer children of the temperate regions, it is almost unknown in the tropics.

Rickets is treated by giving cod-liver oil, or the pure vitamin may be administered.

Summary.

An Adequate Diet.

Calories—2,500 to 30,000, protein 70 grams, calcium, iron, and vitamins.

Multiple Deficiency Disease.

The commonest deficiency disease in the tropics.

Due to inadequate intake of calories, protein, and probably the vitamin B group.

Manifestations—Failure of growth in babies, loss of weight in adults. Soft brown hair, pale skin, mosiac shins, diarrhœa, limb pains, anæmia, liability to infections.

Treatment—Diet rich in calories, protein, liver, and the vitamin B group.

Deficiency of Calcium.

Largely depends on the vitamin D content as well as the calcium content of the diet.

Signs—Softness of the bones.

Deficiency of Iron.

Depends on:

(1) The iron content of the diet.
(2) The iron needs of the body; increased in pregnancy and in women due to menstrual loss.
(3) Iron losses in hookworm disease.

Signs—Anæmia.
Treatment—Iron in medicines.

Deficiency of Vitamin A.

Depends on the intake in yellow or green vegetables and fruits.
Signs—Xerophthalmia, night-blindness, phrynoderma.
Treatment—Red palm oil or sources rich in the vitamin.

Deficiency of Vitamin B_1.

Depends on the intake—only common in the outer layer of cereals; removed largely in the milling —*e.g.*, polished rice.
Signs—In beri-beri heart failure, neuritis.
Treatment—The pure vitamin for severe deficiencies, better cereals.

Deficiency of Nicotinic Acid.

Depends on the intake in animal flesh foods, but little in vegetables.
Signs—In pellagra, dermatosis, mosaic skin, diarrhœa, insanity.
Treatment—The pure nicotinic acid, liver, flesh foods.

Deficiency of Vitamin C.

Depends on the intake in fruits and vegetables. Soon reduced on storing or on cooking.

Signs—In scurvy, bleeding from the gums or elsewhere, anæmia, general ill-health.

Treatment—Fruits or vegetables, in severe cases the pure vitamin.

Deficiency of Vitamin D.

Depends on the amount made by the direct action of sunlight in the bare skin. This is usually adequate in the tropics. Contained also in all animal fats.

Signs—In rickets, soft bent bones, caries in the teeth.

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